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Editorials.

EDUCATION AND EXAMINATIONS.

THE question as to whether our present method of education is the best which can be devised has brought forward a number of letters in reply to the remarks of "Syntax" in the April number of the VETERINARY JOURNAL. One, written by a well-known teacher who prefers for the time being not to disclose his identity, is of especial interest, because it entirely opposes the idea that teachers themselves should form an integral part of the examining Board; the chief reason given being that there is always the possibility of a certain amount of partiality being shown, and that a disagreement might even occur between the two examiners as to the fitness of a candidate to pass. The matter is one of more than ordinary interest, and we invite the attention of other correspondents to the subject.

PUPILAGE AND PRACTICAL EFFICIENCY.

WITH the vacation approaching, the question of pupilage with a busy practitioner is one which should be uppermost in the mind of the student who has just completed one or other of his numerous professional examinations, and there can be no two opinions on the advisability of such a course for the man who intends to adopt private practice as a means of earning his future livelihood. There

seems to be a considerable difference of opinion as to whether a young man should see practice before or after he has obtained the diploma, and the chief point round which the question rages is as to whether what is termed "seeing practice" is, or is not, apt to produce a tendency towards empiricism. It is certainly better that clinical work should wait until a sound scientific foundation has been laid, but it is also very essential to recollect that by the time the diploma has been gained an age has been reached at which the graduate is not nearly so ready to learn the tact and adroitness in the management of clients which is absolutely essential to enable him to steer clear of the many pitfalls which usually accompany the feeling of self-satisfaction and triumph of the newly fledged *diplomé*.

In addition to that, the question of a thorough knowledge of the habits of animals in a state of health is one which we as veterinarians have especially to consider, and those who are in favour of the idea that pupilage would be beneficial to the intending veterinary graduate would willingly give way to those who are against it, if only the first year's student had had a preliminary training on a farm or other large place where animals were bred.

The College which will be the first to start an experimental farm to which its younger students can be sent in batches, in order that they may gain a practical insight into the habits of animals in a state of health, will undoubtedly turn out the most successful so-called "practical" men. It is the general outcry of the established practitioner that the majority of young men who come to him in the position of assistant are of very little use in general practice until they have been in his employ a sufficient length of time to learn tact, experience, riding and driving, the names of the various breeds of animals, and the thousand and one things which make a practitioner successful, and with which most clients are already intimately familiar.

EDUCATION AND EXAMINATIONS.

BY A TEACHER.

THE questions raised by "Syntax" in the April number of the VETERINARY JOURNAL are well worthy of serious consideration. The matter chiefly affects students and teachers, but that should not deter practitioners from taking an active interest in it. On the contrary, since they have "been through the mill" and any changes in the methods of examination would not personally affect them, they might be regarded as most competent to consider and discuss the question, and to be strictly impartial in so doing. Of course, the Council of the Royal College of Veterinary Surgeons is the proper body to deal with the subject, but they would be more likely to give satisfaction in dealing with it if it were fully discussed beforehand by those interested, as they would then better understand the general feeling on the point.

At the beginning of his contribution, "Syntax" draws attention to what he regards, and I think rightly, as one of the chief objects of education, namely, the cultivation of the faculties of careful observation and the drawing of logical conclusions from those observations, or in his words, "teaching them how to teach themselves." However, I am unable to discover whether he advises this with the implication that it is not already done. In my opinion, no teacher can be regarded as a "good" teacher unless he has that principle constantly before his mind. No good teacher is satisfied with detailing hard, dry facts or conclusions. His chief interest usually lies in the reasoning out of those facts, and in showing his students how they can form reliable conclusions by the careful consideration of facts coming under their own observation. Examinations undoubtedly always will concern questions of fact quite as much as, or even more than, questions of method, and consequently it will always be difficult to get a large number of students to trouble to reason out things for themselves when they can just absorb the facts without the trouble. I grant that it is not a desirable state, but I am afraid it is nevertheless true, and in many cases insurmountable. However, I am of the opinion that the greatest evil at present in a student's course is the objectionable practice of "slacking at the beginning of the year and cramming at the finish"; and any system that could be introduced to do away with that would indeed be a blessing in disguise to students. There, too, in my opinion, lies the chief cause of dissatisfaction at examination time. I have very few faults to find with the present system of extern examiners, and confidently assert that no student need fear confronting his examiners if he has conscientiously worked from the *beginning of the year*. Students are too apt to consider that "passing the examination" is the *end* to be attained. They forget that examinations are only the means to an end. Examinations are only the means adopted to safeguard the public and to ensure a minimum amount of knowledge of the subject professed.

With regard to the system of examinations adopted by the Royal College of Veterinary Surgeons, viz., by extern examiners, "Syntax" dismisses it without any comment of his own. To my mind, he has not brought one single sound argument against it unless it is that another system might be more economical. While the teaching

colleges are dependent upon the number of students for their very existence, and so are in direct competition with each other, I doubt if any other system of examination would give anything like such satisfactory results. Under the present system a healthy rivalry is established between the schools, to see who can obtain the best percentage of passes under a perfectly impartial independent board of examiners. Immediately teachers become examiners there would always be the possibility of favour and partiality, or at any rate there would be the possibility of such suspicions, since there would be a motive reducing the standard of examination in order to get a good percentage of passes; and then if the examinations were easier at one school than another, see how quickly the number of students would go up. Surely, one should avoid the *possibility* of such a condition of affairs, and, to me, it is difficult to see how any other system would answer as well as the present one. Now, with reference to a combination of one intern and one extern examiner, I am afraid that there would too often be a difference of opinion between these two as to the fitness of a candidate to pass. The teacher would probably favour his student and want to let him through when the extern examiner thought him not up to the required standard. Under those circumstances a deadlock might arise unless a third examiner were called in. Surely such a scheme is impracticable.

So far as the existing scheme is concerned it may not be perfect, but "Syntax" will require to show stronger reasons for its rejection than he has done if he wishes a change to be brought about. For some years I have been able to watch closely the examinations, and together with a colleague teaching subjects for the same year's examination we have placed the students in what we thought was the order of merit, based both on written and oral class examinations. In almost every instance the examiners' results have agreed with our estimate. Surely that in itself speaks very highly indeed of the abilities of the present board, and it makes me doubt whether any other system could be better.

EDUCATION AND EXAMINATIONS.

BY SYNTAX.

HAVING been permitted to see, in proof form, the remarks made by "A Teacher" on my communication under the above heading, it may be expected that I should reply to any criticisms contained therein without loss of time. The purpose of the paper was to provoke discussion upon a subject which, in the opinion of many, urgently calls for serious attention. It is therefore with great satisfaction that I note the possibility of the teachers in the various schools giving expression to their views. It is eminently desirable that the matter should not be allowed to drop, but that teachers, general practitioners, examiners, members of the Council of the Royal College of Veterinary Surgeons, and all and sundry in any way interested in veterinary

education should contribute to a consensus of opinion whereby it may be determined if, and in what direction, modification is necessary in the present veterinary curriculum and examinations.

"A Teacher" expresses himself in doubt as to whether I imply that true education is not the aim of teachers in general. Let me remove any doubt on this point by saying that I consider the veterinary teacher who does not *educate* his students as being the exception and not the rule. At the same time, "A Teacher" will be obliged to confess that there are veterinary teachers whose sole aim is to cram their students with "spoon-meat" in such sufficiency as to insure the passing of an examination. Even teachers with the most commendable sense of their duty towards those in their charge cannot rid themselves of the feeling that their class-work *must* be in accordance with examination requirements, and that work which will produce no effect upon the pass-list must be relegated to a very secondary place. Under the present condition of affairs, small blame can be attached to those who teach for examinations only, or to the students who demand that such methods of cramming should be resorted to.

Remove the temptation—or rather necessity—by making the teacher himself an examiner, and it can be hardly gainsaid that methods of pure "cram" will largely, if not entirely, disappear. I am convinced that it is not the desire of any teacher to turn his students into Strassberg geese, but needs must when a certain person of much—if evil—fame drives. It is unfortunate if I did not make it clear that, in my opinion, greater freedom should be given to teachers. This was the main thesis of my communication, and this, to my mind, leads up to a very sound argument against the present system of examinations followed by the Royal College of Veterinary Surgeons.

It would probably be well to defer further comments upon the article of "A Teacher" until others have taken up the question. It need only be added at this time that the dreaded deadlock, caused by a teacher favouring his own student while the external examiner refuses to pass him, is a contingency not experienced in those examinations where an internal and external examiner do, at the present time, act together, and where such a system has been in operation for a time sufficiently long to test its practicability. We can only argue from the known to the unknown, and if the plan has been found to work smoothly and satisfactorily among other corporate bodies it is fair to presume that it would so work in the veterinary profession.

My grateful thanks are due to "A Teacher" for having opened with great courtesy a discussion which it is in the best interest of veterinary education should be continued.

Original Articles.

AN ADDITIONAL PRESACRAL VERTEBRA IN THE HORSE.

BY L. L. STEELE.

(FROM THE ANATOMY DEPARTMENT, ROYAL VETERINARY COLLEGE, EDINBURGH.)

THE student of comparative anatomy, examining and dissecting normal structures time after time, gladly welcomes any departure from the condition which he has found to obtain with unbroken regularity. He recognises that, when a variation occurs, a new part of the field of anatomical study is open to him.

Inasmuch as variations may be fortuitous, progressive, or regressive, it it necessary for the observer to consider them from one or several points of view. It may be that the variation is one which illustrates the normal condition of a more primitive animal, *i.e.*, it is regressive. Or it may be that the unusual condition is a step toward greater specialisation, when it could be regarded as progressive. Or, in the third place, it may be merely accidental.

A cursory examination of anatomical literature leads to the conclusion that osteological variations are more common than myological irregularities. It would, however, be unsafe to say definitely that this is the case, for it may be that the bones attract attention more frequently than do the muscles. Be this as it may, the fact remains that osteological anomalies have been the subject of most brilliant work. One need only glance at the communications of Rosenberg, Dwight, Bardeen, Mall, Ancel, Sencert, Topinard, Steinbach, Staderini, Bianchi, Paterson, and others too numerous to mention, to get some idea of the significance of the anomalous conditions.

The present communication deals with a numerical vertebral variation of some interest in view of the scarcity of records of similar conditions as occurring in the horse. That the number of presacral vertebræ is not the same in all members of the equidæ is well known ; and it is further to be surmised that, given a sufficiently large number of specimens, some variation would even be found among members of the same species.

The subject which showed the following variation was one of the horses obtained for the Practical Anatomy Class of this College, and the vertebræ are at present in the possession of Dr. Charnock Bradley. The condition is as follows: All the vertebræ, up to the 17th thoracic, are perfectly normal. On the 18th thoracic vertebra, the cephalic demifacet of the centrum, and the facet on the transverse process, are confluent, which condition, however, frequently obtains in the normal spine. Indeed, this bone is normal, except for the presence of caudal demifacets. The caudal demifacet of the right side is comparatively well marked, while that of the left is correspondingly obscure. The 19th thoracic vertebra (fig. 1) is a perfectly normal ultimate bone, though its spinous process is stouter and broader, and its transverse processes and the ventral ridge are stronger than the corresponding parts of the 18th vertebra ; but these differences are so slight as to be scarcely maintainable. The division of the transverse process, normally seen in the posterior members of the series, has occurred as usual. The process presents the normal facet for articu-

lation with a rib, and indeed cannot be said to differ in any respect from a normal ultimate member of the thoracic part of the column.

The extra vertebra has insinuated itself without in any manner disturbing the normal anatomical arrangement of the spinal column; the anticlinal vertebra being the 15th, as is frequently the case in normal spines.* But because of the presence of an extra thoracic vertebra, the changes normally seen in passing from before backwards in the thoracic part of the column have occurred more slowly than is usual.

Articulating with the before-mentioned facets on each side is a rib, somewhat rudimentary, but still possessing the essential characters of a costal element, in that each carries facets for articulation with the transverse process of its vertebra and with the demifacet of the bone immediately cephalic to it. The rib on the right side is shorter and

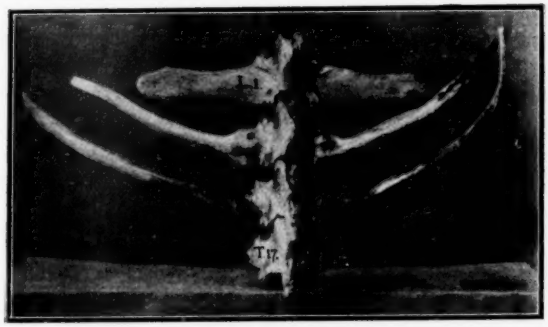

FIG. 1.—Additional presacral vertebra. Dorsal aspect of last three thoracic and first lumbar vertebræ. T 17 = 17th thoracic vertebra. L 1 = 1st lumbar vertebra. * = Anchylosis of rib to 19th thoracic vertebra.

more slender than that on the left, as may be seen by comparing the following measurements:—

Left rib, measured the whole length of its cephalic border, equals 21 cm. Right rib, similarly measured, equals 16·5 cm.

The circumference of the left rib, measured at a point 3 cm. from the commencement of the cephalic border, is 3 cm.; that of the right rib is 5 cm.

The rib on the right side, viewed from the ventral aspect (see fig. 2), shows the articular surfaces very plainly. The rib on the left side shows almost complete anchylosis both dorsally and ventrally; but there can be little doubt that originally it was completely separable from the vertebral column.

* In most text-books the 16th is described as the anticlinal, but perhaps the 15th merits the term quite as often. *Vide* Macfadyean's "Comparative Anatomy of the Domesticated Animals," part i., "Osteology and Arthrology," p. 33: "The 16th (spinous process) is vertical." Ellenberger and Baum, "Handbuch der vergleichenden Anatomie der Hausthiere," Berlin, 1903, p. 37: ". . . . . der (spinous process) des 16 Brustwirbels senkrecht steht." Martin, P., "Lehrbuch der Anatomie der Haustiere," Stuttgart, 1904, Bd. ii., p. 27: "Die allmähliche Abnahme der Neigung fuhrt (meistens) am 16 oder diaphragmatischen Wirbel zur senkrechten Stellung des Proc. spinos."

Connected with each rib was a small costal cartilage, which exhibited nothing peculiar, except that each was united to its rib by a fibrous band. Their greatest length was 6·5 cm., and their greatest circumference 2·5 cm.

In order to properly place the present abnormality, it seems well to draw up a scheme of possible presacral variations, illustrated by cases which have already been described.

A. *Variations in Form.*—No additional presacral vertebra.
  (*a*) Thoracic increase + lumbar decrease.
  (*b*) Lumbar increase + thoracic decrease.

B. *Variations in Number.*

(1) Decrease: absence of one or more presacral vertebræ.
  (*a*) Thoracic decrease.
  (*b*) Lumbar decrease.

(2) Increase: addition of one or more presacral vertebræ.
  (*a*) Thoracic increase.
  (*b*) Lumbar increase.

EXAMPLES (HUMAN) OF A (*a*).

Embryo	Collection	Described by	Age	Length	Vertebral Formula.
IV.	Rosenberg	Rosenberg	8 w.	23 mm.	C_7, T_{13}, L_4, S_3, C?
IV.	,,	,,	9 w.	?	C_7, T_{13}, L_4, S_3, C_5.
XCVI.	Mall	Bardeen	12 w.	44 mm.	C_7, T_{13}, L_4, S_3, C_6.
—	—	,,	—	—	C_7, T_{13}, L_4, S_3, C_3.
—	—	Ancel and Sencert	—	—	C_7, T_{13}, L_4, S_6, C_3.

EXAMPLES OF A (*b*).

Collection	Described by	Length	Age	Vertebral Formula.
Mall	Bardeen	18 μ	6 w.	C_7, T_{11}, L_6, S_3, C_4.
—	Paterson	—	—	C_7, T_{11}, L_6, S_3, C_5.
—	,,	—	—	C_7, $T_{11/12}$, $L_{6/5}$, S_3, C_4.
—	,,	—	—	C_7, $T_{11/12}$, $L_{6/5}$, S_3, C_4.
—	,,	—	—	C_7, T_{11}, L_6, S_3, C_3.
—	Ancel and Sencert	—	—	C_7, $T_{11/12}$, $L_{6/5}$, S_3, C_2.

Several examples of B 1 (*a* and *b*) are mentioned by Dwight [1] as occurring in the cat.

Vertebral Formula.

No. 9379 – 56 = C_7, T_{12}, L_4, S_3, C_4 or $_5$.
9379 – 57 = C_7, T_{12}, L_4, S_3, C_3.
9379 – 58 = C_7, T_{12}, L_4, S_3, C_4.
9379 – 59 = C_7, T_{12}, L_4, S_3, C_4.
9379 – 70 = C_7, T_{11}, L_3, S_3, C_2.

EXAMPLES (HUMAN) OF B 2 (*a*).

Embryo	Collection	Described by	Length	Vertebral Formula.
III.	Rosenberg	Rosenberg	20 μ	C_7, T_{13}, L_5, S_5, C_4.
IV. A	,,	,,	25 μ	C_7, T_{13}, L_5, S_5, C_5.
XLV.	Mall	Bardeen	28 μ	C_7, T_{13}, L_5, S_5, C_6.
—	—	,,	—	C_7, T_{13}, L_5, S_5, C_8+.
—	—	,,	—	C_7, T_{13}, L_5, S_5, C_3+.
—	—	Gladstone	—	C_7, T_{13}, * L_5, S_5, C_4†
—	—	Low	—	C_7, T_{13}, L_5, S, C.†

* The 13th thoracic vertebra carried ribs of different sizes.
† Adult human subjects.

EXAMPLE (HUMAN) OF B 2 (*b*).

Described by	Vertebral Formula.
Ancel and Sencert	C_7, T_{12}, L_6, S_5, C_4.

The following is a table of instances (all human), with twenty-five presacral vertebræ:—

Investigator	Number Studied	Thirteen Thoracic Vertebræ		Six Lumbar Vertebræ.	
		Number	Percentage	Number	Percentage
Bardeen	32	1	3·1	—	—
Rosenberg	9	1	33·3	—	—
Paterson	30	—	—	4	13·3
Steinbach	14 males	—	—	1	7·1
,,	25 miscellaneous	—	—	1	4
,,	29 males under 1 year	—	—	1	3·4
,,	21 females ,,	—	—	1	2
Topinard	350	1	·3	9	2·6
Staderini	100	2	2	2	2
Bianchi	60 males	—	—	3	5
,,	130 miscellaneous	—	—	3	2·3
Bardeen	14 males	—	—	1	7·1
,,	16 miscellaneous	1	6·3	—	—

The specimen under consideration at present belongs, of course, to the class B 2 (*a*) in the above schema, and corresponds to the five cases in the human subject described by Rosenberg [4], Bardeen [2], Gladstone [5], and Low [6]. Many more instances might be given, but those already cited will be sufficient.

It would perhaps be well to review the chief theories which are held with regard to numerical anomalies in the spinal column. Of

these there are three which occupy an outstanding position, namely, Rosenberg's, Dwight's, and Bardeen's.

According to Rosenberg [4], the lumbar vertebræ are modifications of the thoracic vertebræ, and both phylogenetically and ontogenetically the ilium travels upwards on the spine, so that originally the sacrum is composed of vertebræ farther from the head than it is later.

If the ilium does not advance as far as usual, the spine is archaic. If it travels farther than usual, the condition produced is progressive.

Rosenberg considers that the middle part of the spine is the most primitive, and holds that the division of the column into regions is the work of two chief factors, operating simultaneously, and in opposite directions. These factors are the cervical and lumbar vertebræ, which tend to absorb the adjacent thoracic vertebræ. He admits that if these two factors stood in constant relationship, one to the other, it would be possible to predict the condition of one part of the column by

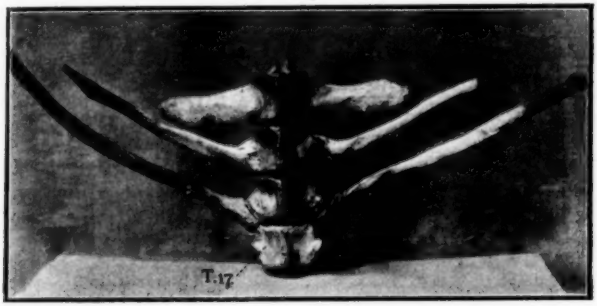

FIG. 2.—Additional presacral vertebra. Ventral aspect. T 17 = 17th thoracic vertebra. L 1 = 1st lumbar vertebra.

examining the other. For example, from an inspection of the anterior thoracic segments the condition of the posterior members of the series could be determined without examination. But, as Rosenberg points out, great variation occurs in the relationship of the two factors, and therefore so simple a prediction is impossible.

Dwight [3], in the same connection, makes the following assertions:—

(1) Variations occur in two ways: (*a*) By irregular development of the costal elements at, and near, the ends of the regions of the spine; (*b*) by irregular segmentation through which there are more or fewer vertebræ than normal.

(2) Variations of both kinds are variations round a mean; it is not impossible that some of them may be reversive; that any are progressive is mere assertion.

(3) Assuming the correctness of Rosenberg's studies in ontogenesis, his view may account for some of the variations, but even in these cases something more is needed to explain the concomitant changes.

(4) Variations of the costal elements at one end of a region are

often associated with variations of an opposite nature at the other end. Several regions may be involved, and the two sides may vary independently.

(5) Variations which separately seem either reversive or progressive, generally lose that appearance when the whole spine is considered.

(6) After the occurrence of the original error in development there is a tendency for the spine to assume as nearly as possible its normal disposition and proportions. This (as do also concomitant variations, and indeed all development) implies a vital principle.

In his published observations, Bardeen [2] draws the following conclusions:—

(*a*) After the attachment of the ilium to the vertebral column is made, it is not segmentally altered during subsequent development.

(*b*) Regional variation in the vertebral column is an inherited condition which is manifest early in embryonic development. A sufficient number of individuals of a given race would probably show the same frequency of regional variation throughout the course of development from the sixth week to the adult condition.

(*c*) In the skeleton of white females so far specifically reported, variation in the number of presacral vertebræ is less frequent than in the male skeleton. Variation in the spinal column of female negroes is slightly greater than in the male.

(*d*) There is an equal tendency toward reduction and toward increase in the presacral vertebræ. Each condition has been reported in over 4 per cent. of a thousand skeletons specifically examined.

In conclusion, it may be well to consider the present position of the question of the occurrence of such variations. The cause of the original error is still a matter of doubt; still, one is not justified in supposing it to be either hereditary or a progressive step. The essential fact is that, once the error has occurred, the organism strives to correct it. The result of this effort is variable, being more successful in some cases than in others. Sometimes the corrective effort acts independently on the two sides (Dwight).

There is no doubt that too much stress has been laid upon archaic and progressive conditions. That such do occur undoubtedly is no justification for including nearly all osteological anomalies in one or other of these classes. It would often be more consistent with facts if the causation and significance were to be more generally stated as being dependent upon some developmental disturbance of, as yet, an unknown nature.

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Clinical Articles.

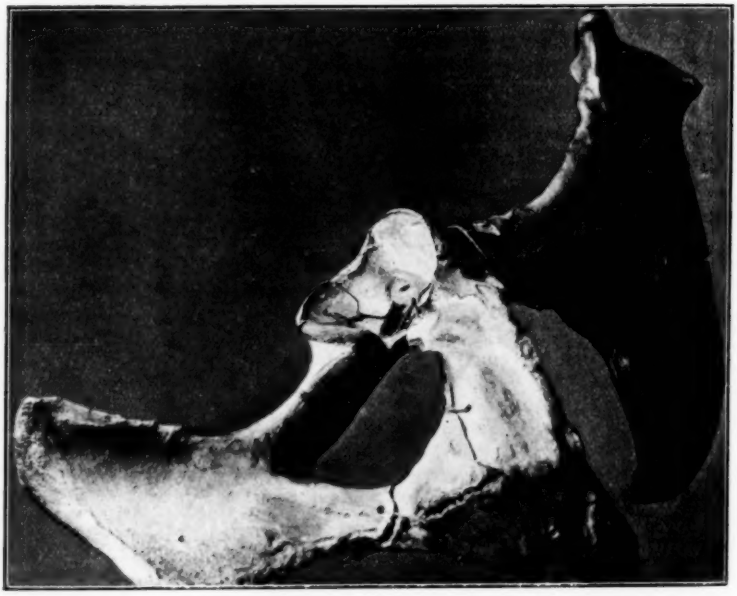
FRACTURE OF THE PELVIS.

BY CAPTAIN A. J. WILLIAMS, ARMY VETERINARY CORPS, NORWICH.

A TROOP-HORSE belonging to the 7th Hussars, 14 years old, slipped when leaving the stable on March 7; she fell heavily on the off side, and was unable to rise without assistance.

She showed great pain, there was marked deformity of the off quarter, which was quite flattened; she could put a little weight on the limb, and showed a peculiar action when moved, the leg being swung under the body in a position of extreme adduction.

On abducting the limb marked crepitation could be heard near the coxo-femoral articulation, pointing to a fracture in the region of the cotyloid cavity; upon examination *per rectum* I found a fracture of the shaft of the ilium.



Fracture of the Pelvis.

The case being hopeless she was immediately destroyed, and *post-mortem* examination revealed fractures as follows:—

The symphysis pubis was split, the pubic bones showed fractures extending from the ischio-pubic symphysis into the obturator foramina, two fractures into the foramen on the right side and one on the left.

The cotyloid cavity showed three fractures, two extending from the postero-external portion of the cotyloid rim into the non-articular depression and pubio-femoral groove, the other from the rim of the foramen to the centre of the cotyloid cavity.

The shaft of the ilium was comminuted, and a fracture of the gluteal surface extending to the iliac crest.

THE ACTION OF ESERINE IN A CASE OF SAND COLIC.

BY CAPTAIN A. J. WILLIAMS, ARMY VETERINARY CORPS, NORWICH.

Subject.—A six-year-old Tibetan mule, belonging to the 15th Mule Corps, brought down to Siliguri, the base of the Sikkim Tibet Mission, at the end of the Expedition in December, 1904.

History.—On December 30, 1904, at 7 p.m., the salutri reported to me that a mule was suffering from colic, was in great pain, and had been ill since 5 p.m. He had administered the following: ℞. Spts. æth. nit. ʒj., ol. terebinthæ ʒj., ol. lini. oj.

He examined the rectum about 6.30, and found it practically empty. I ordered the following: ℞. Ext. bellad. ʒj., ammon. carb. ʒij, to be given in bolus, and gave instructions that I should be informed regarding the state of the case at 9 p.m.

At 9 p.m. the salutri reported no improvement. I went to the lines, and found the condition of the animal as follows: Pulse good, acute abdominal pain, spasms every few minutes; if made to rise she would get down again immediately, tympanitis, rectum empty, no sign of borborygmi, anxious expression, lips retracted, rolling violently from side to side; in fact, every symptom of very acute abdominal pain.

I administered, hypodermically, eserine hydrobrom. gr.i., Burroughs Wellcome "Tabloid." In five minutes there was increased pain, the spasms appearing at quicker intervals; in less than ten minutes peristalsis was restored and borborygmi could be heard some distance away, and in fifteen minutes from the time of injection there was a violent escape of flatus and a quantity of pultaceous fæces passed.

Fæces were afterwards passed five times in twenty-five minutes at about five minutes' interval, and there was a sixth motion three-quarters of an hour from the time of injection. In one hour from the time eserine was given the animal was free from pain and wanted to feed.

The evacuations were noticed to be practically pure sand; they were collected, placed in a bucket with some water, and 3 lb. 5 oz. of sand was separated out. Next day the mule passed normal fæces, and appeared quite fit.

The mules were watered at a river near Siliguri, and I found that this animal always buried his nose deeply in the water when drinking. The river was very low, so it is easy to understand that large quantities of sand could be taken up with the water.

The officer commanding the corps informed me that the river near Siliguri was the only place where the animal could have taken up the

particular kind of sand, and it is interesting to note that the quantity was taken up in less than a month.

The effect obtained by one grain of eserine within one hour in this case was really remarkable.

During the South African campaign, where cases of very acute tympanitis, due to tulp poisoning, were of daily occurrence, I found eserine almost a specific combined with puncture of the intestines when the tympany threatened death from asphyxia. In many very acute cases hypodermic medication was the only possible form of treatment, drenching being impossible, as the animal was in a state of semi-asphyxiation. In such cases I used the trochar and cannula to relieve the intense tympany, then injected eserine, and I am certain no other drug would have given such good results.

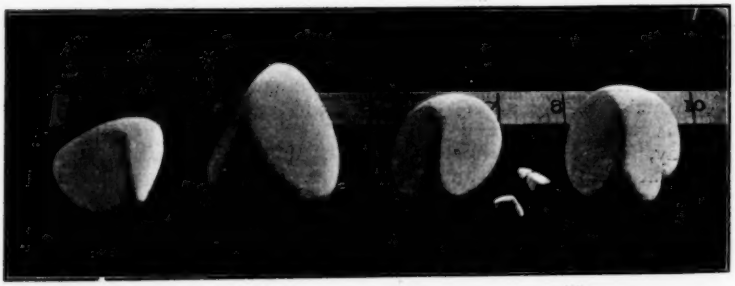
CYSTIC CALCULI IN A BITCH.

BY WILLIAM ROBERTSON, M.R.C.V.S., AGRICULTURAL DEPARTMENT, CAPE TOWN, SOUTH AFRICA.

THE accompanying photograph may prove of interest to many members of our profession.

The calculi depicted were obtained on *post mortem* from the St. Bernard bitch "Champion Braeside Valkyrie."

I saw the animal during life; she was in a miserable and emaciated condition, despite the best of food and attention, and was frequently passing small quantities of very foul-smelling urine, mixed occasionally



with blood and epithelial *débris*. The animal died before any arrangements in regard to operation could be discussed.

On *post mortem* the bladder wall was much thickened, and the lining eroded and ulcerated in patches. The owner, Mr. M. Van Zyl, supplied the following history:—

Champion "Braeside Valkyrie," born November 4, 1899; died December 29, 1905; breeders, Inman and Walmsley, Bowden, England. She had gradually been declining in health and condition during

the past year, having arrived here on June 9, 1903. On the voyage out she suffered greatly, always passing quantities of blood with her urine.

All her puppies have either been born dead, or died soon after birth.

OBSERVATIONS ON A CURIOUS DISEASE AFFECTING CATTLE IN CEYLON.

BY G. W. STURGESS, M.R.C.V.S., GOVERNMENT VETERINARY SURGEON, CEYLON.

Kora-gedi.—This is a term given by native vedaralas to a condition common amongst cattle in Ceylon, certainly in the Colombo district, which I think must be recognised as a separate and distinct disease. The term signifies "the boil which lames the animal," and in the absence of exact knowledge of its pathology it is as good as any other. As far as can be gathered it has been known for a long time in Ceylon and South India.

Symptoms.—It is characterised by slow-forming abscesses which appear in front of the shoulder and in the flank in the majority of cases, so much so as to be quite typical of the disease. In a good number of cases it is also accompanied by an affection of the feet (a kind of laminitis), in which the hoofs grow abnormally long and out of shape, turning up at the toes, the animal walking on the heels. The abscesses sometimes attain a very large size, and contain a large quantity of thick yellowish creamy pus, which has been found on bacteriological examination to be sterile. They are quite loose and feel like a ball under the skin, and can be dissected out easily, having a firm fibrous wall. They are not painful and mature very slowly, taking several weeks in most instances, the period being quite indefinite. They are sometimes on one side only, sometimes bilateral. In some cases in males abscesses appear in the scrotum, and in females in the udder. In one case under my notice lately abscesses appeared under the ears.

The general health appears to be little affected; appetite, rumination, defæcation, urination, lactation, normal. In males the animal works as usual, unless foot lesions appear. Temperature shows very little variation after abscesses form. If working bulls are rested when the abscesses appear flesh is gained. The disease seems to be more severe in Indian cattle imported into Ceylon than in native cattle. In the case of native black cattle abscesses form, mature, burst, and heal without causing any ill-effects. The attention is in all cases first attracted by the appearance of a lump either in the shoulder or flank, often both, which developes into the abscess referred to. In a number of cases the abscess eventually bursts or is lanced, heals up easily, and the animal remains in good health. In others the disease runs a very chronic course, stiffness appears in the limbs, the animal walks with difficulty, the hoofs commence to grow out of shape and turn upwards, the foot being put down on the heel. No sores are present. Progression becomes more and more difficult, and the animal walks as if it had "stringhalt," desires to lie down as much as

possible, and finally dies from exhaustion. They will eat and drink and chew the cud up to the last.

I have not noticed the foot lesion in any native cattle. All cases in which it came on were Indian or half-bred cattle. In a case taking the worst form there appears to be some nervous lesion, a quiet animal becomes nasty tempered and difficult to approach. Sucking calves remain healthy.

Out of nineteen cases that I have seen during the past six months, one died, and two with bad foot lesions and useless were shot for *post-mortem* examination.

Cause of the Disease.—Unknown. My attention was principally drawn to the disease at the close of the year, when foot-and-mouth disease was general all over the country. At that time very dry, hot, and unhealthy climatic conditions prevailed. There was quite an exceptional outbreak of distemper amongst dogs, in which nervous symptoms were especially prominent (epilepsy and chorea). There are no signs of actinomycosis, and tuberculosis is not in any way indicated by observation of a case. Cases appears in perfect health, and, except for the foot lesions, remain so. Severe cases with large abscesses become emaciated, as would naturally be expected.

Dr. Castellani, Director of the Bacteriological Institute, Colombo, kindly examined many specimens of blood and pus microscopically and bacteriologically, with negative results, no organism being yet found or grown on culture media. On *post-mortem* examination little has, so far, been seen. All the organs appeared to be more shrivelled and drier than normal, and the stomach contained in all cases myriads of a thread-worm, which I take to be *Strongylus contortus.*

Temperature.—In four cases recently with abscesses the temperature has been taken night and morning over a period of thirty-seven days without showing high fever, in fact none at all. Abscesses have formed, been lanced, and healed during that period. The temperature varied from 101° F. in the morning to 102·8° F. (highest recorded) in the evening. Probably if fever is present it is before the abscesses form.

Treatment.—The treatment adopted has been isolation, the abscesses being opened and syringed out daily with corrosive sublimate or iodine solutions, and dressed, and all healed quickly. Internal treatment consisted in the administration of Jeyes' fluid, potassium iodide, arsenic, quinine, Epsom salts, and sulphur. The native treatment consists in firing around the abscesses and poulticing the feet, and the administration of laxative and alterative remedies. They expect a cure in five weeks.

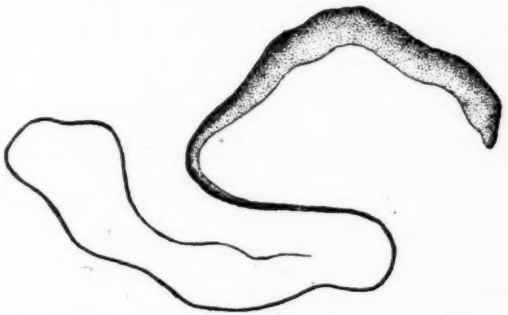
Prognosis.—The prognosis may be very favourable, unless the feet are affected. Even if recovery takes place when the feet are affected, they are so altered as to render the animal useless in the case of working oxen. In the case of milking cows the udder is ruined if a large abscess occurs.

The following are Dr. Castellani's remarks upon the disease, which I am permitted to give :—

Kora-gedi in Cattle (*Sturgess's Disease*).—This disease, very common in Ceylon, has been first described by Mr. Sturgess, Government Veterinary Surgeon, after whose name it might be properly called. The most characteristic feature of the disease is the presence of several

large incapsulated abscesses containing a thick creamy pus. Fever is generally absent. The animals waste rapidly, and disturbances in locomotion may be present. The course of the disease is very long, but recovery may take place if the animals are properly attended to. At the request of Mr. Sturgess I undertook some researches on the etiology of this disease.

Examination of Blood.—Blood was examined during life and *post mortem*. The bacteriological examination made by different methods always gave negative results. The microscopical examination for protozoa was also negative. A parasite especially looked for was the trypanosome. To me the disease does not give the impression of being a form of trypanosomiasis, because, as a rule, in my experience, abscesses are not a feature of the disease either in man or in the lower animals. As Hagger, however, claims to have observed a form of trypanosomiasis in camels with abscesses, the search for the presence of trypanosomes was carried out as thoroughly as



Parasitic worm found in the centre of an abscess (*vide* p. 303).

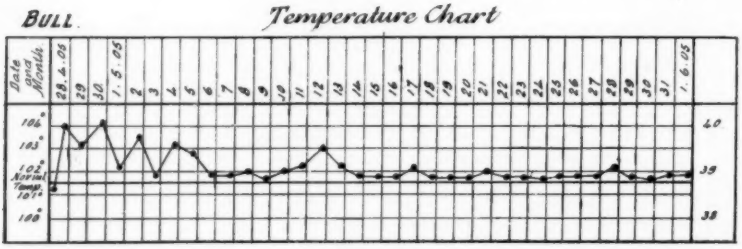
possible. Neither in fresh preparation of blood nor in stained was I able to demonstrate their presence in this disease. The examination of smears from the spleen never revealed the presence of degenerated trypanosomes or anything like the bodies one sees in the spleen of some animals affected with trypanosomiasis.

Examination of Organs.—Pieces of different organs (liver, spleen, heart, glands, &c.) were collected aseptically at the *post-mortem* examinations and investigated for bacteria. The result was constantly negative.

Bacteriological Investigation of the Pus from the Abscess.—The presence of large incapsulated abscesses, as shown by Mr. Sturgess, is the most striking and constant feature of the disease. The pus is generally thick and creamy, sometimes mixed with a little blood. Microscopically it appears to be composed of polymorpho-nuclear leucocytes; a few red blood corpuscles are usually present. The pus was always collected from abscesses which had not burst, with the usual aseptic precautions, in large Petri dishes sterilised in the hot-air steriliser at 140° C. The bacteriological examination was carried out at once. Fresh preparations and preparations

stained with the usual aniline dyes—Gram's, Ziehl's, Romanowsky-Leishman methods—constantly gave negative results. On the usual culture media (broth, agar, blood serum, blood agar) no bacterial growth could be seen.

Inoculation of Animals.—A batch of five guinea-pigs were inoculated subcutaneously with various quantities (1 to 3 cc.) of pus from an abscess. Another group of three were inoculated into the peritoneal cavity. All died with symptoms of acute intoxication; those of the first group in forty to sixty hours, the second group in eight to twenty hours. The bacteriological examination of the blood of the heart and spleen of these animals did not show the presence of any bacteria. A healthy young bull was inoculated on April 28, 1904, under the skin of the left shoulder with 5 cc. of pus taken aseptically from an abscess on a cow affected with the disease. Before inoculation the bull's temperature was 102·2° F.; six hours afterwards it was 104°. The bull showed no signs of malaise that day or the day after, and his appetite remained normal. Fifteen days after the inoculation a small hard tumour could be detected at the seat of injection. A week later the swelling had in-



creased to the size of an apple. It was hard, and showed no signs of fluctuation. Five days later it burst spontaneously in the night, and in the morning when I saw the bull several cubic centimetres of thick creamy pus could be collected, very much like the pus of the abscesses seen in cattle affected with the disease. Bacteriological examination showed the presence of various micro-organisms, but no importance whatever can be attached to such a result, as the abscess had broken spontaneously, and there had been ample time for bacteria to penetrate from the outside. The abscess continued to discharge a little for several days, then granulation set in, and now only a small hard swelling is visible. So far no other abscesses have formed, and the bull is to all appearances quite healthy. I annex the temperature chart of the animal (*vide* chart).

Examination of Abscesses for Animal Parasites.—For protozoa hanging drop preparations and films stained with hæmatoxylin and Romanowsky-Leishman were made. No protozoa could be seen. In the search for higher animal organisms the pus, which is generally thick and somewhat hard, was teased up with dissecting needles under a low power of the microscope or without the microscope. A certain advantage is given by mixing some 4 per cent. formalin solution with

the pus. The teasing of the pus is then rendered much easier. Such an investigation takes a very long time, because the quantity of pus contained in one abscess is very large. For this reason only a few abscesses could be examined completely (7). In one case in the pus in the centre of the abscess a worm was met with, and in another case a portion of the body of the same parasite was found. The parasite is represented in the annexed illustration. I have sent it to Professor Blanchard, of Paris, for identification, and therefore do not go into particulars as regards its internal structure and measurements. I have not yet received any communication from Professor Blanchard. The worm presents a long filiform neck and a thick, comparatively short body. When fresh it was of a whitish colour; kept a few days in spirit and then in a 4 per cent. solution of formalin it acquired a dark brownish colour. This worm belongs certainly to the family *Tricotrachelidæ*, and as far as I can judge it has a certain resemblance to *Tric. affinis*. The presence of the parasite in one of the abscesses and a portion of it in another is somewhat suggestive, as it is well known that, for instance, in man worms are capable of causing abscesses. At the same time, it would be premature to come to any decision as regards the etiology of the disease. (*Vide* illustration.)

CASTRATION OF A CRYPTORCHID.

BY J. J. O'CONNOR, M.R.C.V.S., PROFESSOR OF SURGERY, ROYAL VETERINARY COLLEGE, DUBLIN.

THE subject was a five-year-old thoroughbred, which had become very troublesome and wicked, and on which two unsuccessful attempts at castration had been made by different practitioners. Proceeding in the usual way and perforating the anterior wall of the upper part of the inguinal canal with two fingers I searched for the testicle and cord; not finding either I inserted my hand into the abdominal cavity and found a normal-looking testicle just inside the pelvis. As the animal had not been properly prepared, as instructed, the abdomen was distended, and the small bowel persisted in protruding through the abdominal perforation.

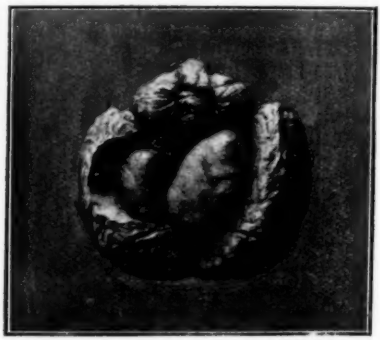
Having removed the testicle I plugged the scrotum with sterilised gauze, maintaining it in position by sutures. I was informed that the dressing was not removed until a week after the operation, the wound being then quite healthy. Recovery was uninterrupted. Chloroform was used as the anæsthetic.

A CASE OF PSAMMOMA.

BY S. M. WOODWARD, M.R.C.V.S., SHEPHERD'S BUSH, W.

ON March 24, last year, I was called to attend an aged bay gelding which had fallen in the street and was unable to rise. With difficulty he struggled up, but seemed quite powerless to move, any attempt only producing a blundering movement and a fall. He was placed in an ambulance and brought to the infirmary, where he was placed in slings.

He stood with all four legs wide apart, his head pressed against the wall, breathing very laboured, stertor very marked. The owners' veterinary surgeon called to see him on the following day and gave me the history of the case. He had been laid up a fortnight previously with symptoms of congestion of the brain, but recovered in a remarkable degree, so much so that he was put to work. On the day on which he fell in the street he had done a full day's work in a pair horse pantechnicon van. As he was an old horse and of little value the owners had him destroyed, the knackerman pithing him to avoid any damage to the brain.



Psammomas in the ventricles of a horse's brain.

Post Mortem.—Meninges injected. On cutting through the pia mater in the longitudinal fissure, the two hemispheres were separated, and a large psammoma was discovered lying up against the inner side of the left hemisphere, having its origin in the left lateral ventricle. In contour it was the shape of a hen's egg. Measurement, 3 in. by 2 in. In the right venticle another psammoma, of a smaller size, was found, as large as a pigeon's egg. Measurement, $1\frac{3}{4}$ in. by $1\frac{1}{4}$ in.

It will be noticed that a part of the right hemisphere of the cerebum has been removed to better expose the smaller tumour.

SPONTANEOUS ANASARCA.

BY HENRY B. EVE, M.R.C.V.S., FOLKESTONE.

Subject.—A rising two-year-old cart colt (Wales), unbroken and uncastrated, the property of a farmer. The animal was not one of the best of feeders, and was, in consequence, in poor condition.

History.—The owner informed me that he bought the dam, a Welsh cart-mare, in London some time before from a contractor, as she had proved in foal. The colt in question had been turned out to graze during the winter season on wet, poor moorland, and had never done well from the time of weaning.

Symptoms.—All the visible mucous membranes were pale, mouth

cool but sour, and the tongue unnaturally soft; the breath and excretions exhaling a peculiar odour. The skin was dry and harsh; in fact, being in a condition known as "hidebound," and the fæces passed had a fœtid odour and were pultaceous. The colt showed every symptom of "pernicious anæmia," great loss of flesh, prostration, and trailed its hind legs as though suffering from "paraplegia." During locomotion I observe that it turned very sluggishly; it also loathed its food and seldom lay down, and appeared very depressed. The pulse was feeble, jerky, and indistinct; the temperature subnormal. Auscultation of the heart revealed palpitation, and occasionally jugular regurgitation was noticeable, also a kind of rippling murmur was present in the chest as though it contained effusion. There was general swelling of the legs, the œdema being especially noticeable on the sheath and belly; the lips and eyelids were only slightly so. The sheath was enormously swollen; in fact, in a similar condition to that which is seen sometimes as an untoward sequel of "castration," viz., "phymosis." The colt was unable to draw its penis from the sheath owing to contraction of the orifice, the act of urination being performed with difficulty, and the urine being scantily secreted.

Diagnosis.—"Anasarca."

Treatment.—Removed animal into a large barn, there being no loose box available. I had the colt clipped trace high, as the coat was very long, and applied a sheepskin to its loins for forty-eight hours. The diet consisted of whiskey, eggs, and milk three times daily in the form of a drench, as it refused all manger food. Internally I administered alkalies, stomachics, and vegetable tonics, until the appetite returned, when I put the animal on nutritious diet, consisting of crushed oats, chop-hay, and molassine meal. Subsequent treatment consisted of iodide of iron given internally twice daily to absorb the effusion present. The local œdema was overcome by friction with the hand, exercise, diuretics and cold fomentation to the sheath, and lastly by scarification of the latter organ. The animal was convalescent in six weeks, and all the anasarcous swellings disappeared.

THE PUBLIC ABATTOIR SYSTEM IN LISBON.*

It is, indeed, curious how little seems to be known in England about Portugal. Certainly, it is but a small country, yet in the periodical literature of England, the newspapers and the magazines, articles and dissertations abound about such small countries as Holland, Belgium, and Switzerland. On the other hand, Portugal is but rarely mentioned. Perhaps the Fifteenth International Congress of Medicine will help to remedy this omission. If the members can only find time to go about and to investigate some special questions, to visit some of the institutions in which they are particularly interested, they will discover that in many respects Portugal is quite abreast of the times. It may even be said that in some important matters Lisbon leads the way. For instance, how much London would gain if it possessed

* Abstracted, by permission of the Editors, from the Report of the *Lancet* Special Commissioner to the Fifteenth International Congress of Medicine.

a model slaughter-house such as that which was built long ago at Lisbon. How extremely interesting also is the long and arduous struggle of the authorities to secure cheap and wholesome meat for the people. Some years ago the cattle-dealers formed a "ring" or "combine" so as to control the market. Instead of competing with one another they agreed to pay less for cattle and to increase the sale price of meat. Thus they won on both sides, and this at the cost of the cattle-breeders and of the consumers of meat. Thereupon the municipality thought it would break up this "combine" by itself buying cattle and selling meat. Municipal butchers' shops were therefore opened in various parts of the town, and even hawkers were sent round to sell the municipal meat on barrows. The cattle-breeders, however, failed to appreciate this action, though it was intended to protect their interests. Instead of supporting the municipality they allied themselves with the cattle-dealers, and so arranged matters that the municipality had to pay a very high price for the cattle which it bought; on the other hand, as the municipality sold the meat very cheaply it soon incurred a heavy loss. But the greatest disappointment of all was the fact that hardly any poor people profited by this action; they rarely got hold of any of the municipal meat. It was for the most part bought up by hotel-keepers and people who were rich enough to bribe the intermediaries. A special municipal committee was then appointed to investigate the question.

After a long enquiry the present system was instituted. A sort of monopoly was offered, and tenders were invited. The concessionaire or monopolist would be the sole person authorised to buy cattle, but, on the other hand, he had so to arrange matters that the meat could be retailed to the public at an average price of about 10d. per lb. A regular tariff is established in regard to the various parts of meat, and the retail price at which it is to be sold. The number of butchers' shops allowed is limited, and the police watch constantly to see that the meat is sold at the prices fixed by the tariff. But the object was not only to prevent such speculations and combinations as would tend to increase the retail price of meat; it was also thought desirable to encourage the home breeders of cattle. Therefore, the concessionaire was also bound down by the terms of the contract to purchase his cattle from the Portuguese cattle-breeders. If, however, through some exceptional or other circumstance—the shortage of supply or the outbreak of cattle disease—Portuguese cattle becomes too dear for the meat to be retailed at the regulation price, then the concessionaire is allowed to import cattle from abroad, and this without having to pay any duty. Finally, in case of extreme emergency, the importation of frozen meat would be sanctioned. But this latter contingency is considered so improbable and viewed with so much dislike, that no cold storage rooms exist at the slaughter-house. It would be necessary to build such places before frozen meat could be imported. Therefore, visitors to Lisbon will enjoy fresh meat, and will not be called upon to eat any cold storage meat.

In this arrangement, however, two important and dominating factors were not taken into consideration. It was forgotten that it was almost impossible to prevent Spanish cattle straying over into Portugal and Portuguese cattle wandering away into Spain, causing any amount of frontier disputes and "incidents," a treaty had been

concluded abolishing all duties on cattle between the two countries. The second omission was that no account was taken of the varying value of gold. Some years ago, when Portuguese credit was at a low ebb, the Spaniard, with cheaper gold, had every advantage in buying cattle in Portugal. But in time the conditions altered, gold became cheaper in Portugal; there was a moment during the war between Spain and the United States of America when gold was at 100 per cent. premium in Madrid, and even to-day it is at 30 per cent. premium. Therefore it is the Portuguese who have every advantage in buying Spanish cattle, particularly if these can be passed off as Portuguese cattle and sold at the enhanced price artificially created so as to encourage cattle-breeding in Portugal. Thus, now a great discussion has arisen as to what constitutes a cattle breeder. There is a cattle market not far from the slaughter-house. Here there is, and can be, only one purchaser, but there are many to sell. Here the live cattle are inspected by veterinary surgeons, and the one purchaser has every interest to see that cases of disease are detected; he has also every interest to prove that the cattle are not home bred, because if there are not enough Portuguese cattle he may bargain and beat down the price of imported cattle. Having secured the necessary amount of cattle the concessionaire has to hand them over to the municipal authorities at the slaughter-house, and pays them for killing. This, from the public health point of view, is the most important part of the proceeding. All the slaughterers, all the workers who prepare the meat and carry out the multifarious other processes connected with the killing of animals for food, are employed by the municipality. No one has any interest to serve in saving from destruction any unwholesome meat. The retail butcher who, by the way, is not a butcher, since he does not kill, has every interest in having only sound meat, since it does not come from his own cattle. The butcher has no cattle, he is simply a tradesman, and his only interest is in so satisfying his customers so as to keep them and increase their number. Thus it will be seen that, whatever criticism may be made of the present system, it in any case contributes very materially to secure wholesome food for the public. The concession described above, it must be added, only applies to cattle that produce beef and veal. For hogs and sheep anybody may buy or sell, but no one must kill. If an individual was to kill his own pig or sheep he would be severely punished. At the municipal slaughter-house only, and by the municipal employees, is the killing of any animal for food allowed. No one may do this work who has the slightest interest in passing on to the public unwholesome meat. The consumption of meat at Lisbon amounted in 1898 to an average of 31·7 kilogrammes per inhabitant. In a special study on the hygiene of slaughter-houses, I hope to describe in detail the technicalities of the Lisbon slaughter-house, together with the abattoirs of several other towns. This will form part of the controversy in regard to the Chicago stockyards. For the moment I will only say that all members of the International Congress of Medicine who take an interest in such public health questions should not fail to visit the model abattoir of Lisbon. They will be all the more surprised with the excellence of the arrangements, the abundance of space, air, and light, when informed that this is no new institution, but was built so far back as 1871.

DR. N. GERBER'S NEW MILK SUPPLY STATION IN ZURICH, SWITZERLAND.

ALL those who take an interest in scientific dairying will be familiar with the name of Dr. Gerber, and not a few British dairy farmers have had the good fortune to make the acquaintance of this kind and courteous man, who has done so much for the milk supply of Zurich.

Dr. Gerber is not the man to "rest on his oars," and his newest achievements and activities will be of interest both to those who have known the man and his work in the past, and also to those who have not yet come in contact with the fruits of his inventive skill.

In this country Dr. Gerber's name is chiefly associated with the excellent centrifugal test for fat in milk and in milk products, by means of which this important constituent can be rapidly and accurately estimated—indeed, so quick and cheap is the test that at the suggestion of the Board of Agriculture most of the agricultural colleges and agricultural departments of the universities have undertaken to make the test for farmers at the estimated cost price of sixpence per sample (see Leaflet No. 146 of the Board of Agriculture and Fisheries). All farmers are thus able to find out the percentage of fat in the milk of their cows at a very small cost, and it is now quite possible to take this important factor into consideration when selecting cows for breeding for milk production, and also to get timely warning when the milk of the herd from various causes gets too near the limit of 3 per cent. of fat required by law.

Dr. Gerber's milk tester is so simple and easy to use that there is no reason why dairy farmers should not make the test for themselves, but its use by those unaccustomed to chemical work has one drawback, namely, that strong sulphuric acid or oil of vitriol has to be used. Dr. Gerber, however, has faced this difficulty, and now in his own laboratory is using a new and harmless solution to replace the objectionable acid. A series of comparative tests are now being made in the laboratories of the Midland Agricultural and Dairy Institute, Kingston, near Derby, Dr. Gerber's method being compared with other new methods of a similar character which are just being introduced in different parts of Germany. The results of these experiments will be published later.

The activities of Dr. Gerber are not confined to inventing new methods for estimating the fat in milk, &c., for he has just finished building a milk supply station, which must certainly rank with the best and most complete in Europe, and which gives ample evidence of the originality of his ideas and of his inventive genius, every detail being not only his own design, but also constructed under his own personal supervision.

The station is capable of dealing with 40,000 lbs. of milk a day. The milk is received at a large platform which runs round one corner of the building. From here it is taken into the building and weighed, and is then pumped up to the large cooler, of which the top half is cooled with water, the lower half with cold brine pumped from the refrigerating rooms in the basement. In the hot summer months the milk is cooled to a very low temperature by a sulphurous anhydride O_2 refrigerating machine.

From the cooler the milk runs into the large mixers, where it

is well stirred mechanically, and then run off into the various distributing scales, and from here sent in the different vessels off on the rounds.

The other rooms in the large building are of great interest, and include, besides all the necessary offices and workshops, chemical and bacteriological laboratories for milk testing, &c., cheese and butter-making rooms, &c., each of which has some feature of special interest, and is shortly to be well fitted with all the most recent technical appliances. Even on reaching the roof a new contrivance is found, for by the side of the chimney runs a shaft for the ventilation of the whole building. Up the shaft the air passes, being heated not only by steam, but also by the waste steam of the boiler which is conducted up some shaft by means of an iron pipe to the boilers, which are arranged for heating purposes, and also to give enough warm water for the whole of the dairy. This arrangement helps considerably in the general economy of the building. A chief veterinary inspector with assistants in the country, as well as in the laboratory, guarantees to the people of Zurich a good hygienic milk supply.

(*The Creamery Journal.*)

POISONING OF CATTLE BY "JAVA" BEANS.*

SEVERAL cases of poisoning among cattle occurred in Scotland towards the end of last year, the cause of which was not at first very readily identified, though suspicion rested on the pea or bean meal with which the animals had been fed. On the attention of the Board being directed to the matter, the suggestion was made that the poisoning might possibly be due to the meal being made from the beans of *Phaseolus lunatus*, the poisonous properties of which had been investigated at the Imperial Institute in 1902 and 1903,† and had formed the subject of a short note in the *Journal of the Board of Agriculture* for December, 1902 (vol. ix., p. 373). On analysis this was found to be the case, the presence in the meal of a glucoside yielding hydrocyanic acid being ascertained.

The Board instructed one of their inspectors to investigate the matter, and from his report it appears that no less than seven cases occurred in Scotland and one in England in which death or illness among cattle had been attributed to the poisonous properties of the beans in question, known in this case as "Java" beans. The serious losses which have been incurred by the farmers and dairymen affected may be gathered from the following notes: *Case A:* Bean meal given to thirteen cows, with the result that two died and several others were alleged to be suffering from the effects a month later. *Case B:* Two cows ate the bean meal and both died. *Case C:* Thirty-two cows were fed with the meal in this instance and twenty-six of them died. In this case about 3¼ lb. of the meal were given to each cow and symptoms of poisoning showed themselves within a

* From the *Journal of the Board of Agriculture*, March, 1906.
† *Bulletin* of the Imperial Institute, 1903, vol. i., pp. 15 and 112.

few minutes after feeding. Most of the cows died within an hour or so after being attacked. *Case D:* Here a mixture of four bushels of ground maize, four bushels of the beans, and twenty bushels of crushed oats was employed, and on being fed to twenty-six cows resulted in the death of eight and injurious effects to the whole of the remaining animals in the herd. *Case E:* In this instance, four tons of beans invoiced as "Java beans" were purchased, ground locally, and fed to thirty-five dairy cows towards the end of March, 1905. The first time the cattle got the meal only a very small portion was given, merely a handful or two, together with other concentrated food, and chopped scalded hay. One cow showed symptoms of illness, but recovered. She had newly calved, and was drenched for what were supposed to be milk-fever symptoms. On the second occasion, however, when about 1 to 1½ lb. of the meal was given to each beast, together with the same quantities of crushed oats and barley meal, the whole herd became violently ill, but subsequently recovered, with the exception of four cows and a bull, which died very shortly after eating their portions. *Case F:* Here no fatal results occurred, though one or two cows were taken ill. *Case G:* In November, 1905, bean meal was given to a herd of about twenty-five dairy cows, all the cows receiving about 3 lb. each; every beast was attacked and prostrated, one death occurring. On the following day, having recovered, they were again fed with the meal, when all were seized with illness, but, fortunately, on this occasion no death occurred.

In the seven cases which occurred in Scotland the beans were all traced to one firm in Glasgow, though the ultimate source from which they were derived was not ascertained.

They were, however, in the majority of cases, invoiced and described by the sellers as "Java" beans, and a sample of the beans said to have been used in preparing the meal used in one of the cases above mentioned (*Case C*) was sent to the Imperial Institute and identified as undoubtedly the beans of *Phaseolus lunatus*, having all the appearance of these beans as recently imported from Java. The poisonous nature of the uncultivated forms of the beans of *P. lunatus* has formed the subject of investigation at the Imperial Institute, and the following extracts from the current number of the *Bulletin* (vol. iii., No. 4) summarise the available information:—

"The scientific aspect of the question is fully discussed in a paper communicated by Professor Dunstan and Dr. Henry to the Royal Society, and published in the *Proceedings of the Royal Society* for 1903, in which it is shown that the prussic acid is formed from a glucoside, contained in varying amount in the bean.

"It was also pointed out that the beans imported into this country from the East Indies as a cattle food under the names of 'Rangoon,' 'Paigya,' or 'Burma' beans, are derived from cultivated forms of *Phaseolus lunatus*, and that whilst some of these (the white beans) yield no prussic acid, others (the pink beans with small purple spots) yield traces of the acid usually too small to be harmful.

"At the same time, the danger of using the coloured beans of *Phaseolus lunatus* as a feeding stuff was pointed out, and in particular it was indicated that changed climatic or cultural conditions in any locality in which the cultivated forms of the bean are produced might lead in some cases to the production of poisonous forms, and that,

further, there was some difficulty in distinguishing by mere inspection between the poisonous wild beans and the coloured forms produced by more or less careful cultivation, and that consequently if a large trade in these beans were developed, as seemed probable, there would always be risk of confusion between the poisonous and non-poisonous forms.

"It appears that this latter difficulty has already arisen, both in this country and in Holland. Quite recently the Imperial Institute has received from three different firms of importers in this country samples of beans of *Phaseolus lunatus* said to be imported from Java. These beans had seed coats exhibiting the dark purple or buff colours with purple spots, which seem to characterise the poisonous variety of the beans of *Phaseolus lunatus*. The samples were examined in the Scientific and Technical Department of the Imperial Institute, and found to yield quantities of prussic acid varying from 0·03 to 0·16 per cent. These quantities of acid are about the same as those furnished by the wild Mauritius beans derived from *Phaseolus lunatus* previously examined at the Imperial Institute which are well known to be poisonous. These results were communicated to the firms importing these beans from Java, and fortunately it was possible in a number of cases to prevent the sale of further consignments in this country. The beans seem to have been imported, however, in comparatively large quantities, and through a number of different firms, and it has consequently been impossible for all the importers to be warned, with the result that a number of poisoning cases among cattle have occurred.

"The same trouble seems to have arisen in Holland. The Imperial Institute has been informed by the Director of the Colonial Museum at Haarlem that several cases of poisoning both among cattle and human beings have been traced to the consumption of these beans.

"A distinction must be drawn between these highly toxic beans as produced in Java and Mauritius by *Phaseolus lunatus* when growing wild or in a state of partial cultivation, and those produced in India and elsewhere and obtained from the same plants in a state of more or less careful cultivation, and imported as 'Rangoon' or 'Burma' beans. The Indian beans obtained from *Phaseolus lunatus* occur in two forms—(1) quite white and (2) pink with purple spots. Both these Indian forms have been examined at the Imperial Institute, and the former have been found not to yield any prussic acid, whilst the pink beans marked with purple spots have yielded only traces of the acid and may not be harmful.

"The white cultivated beans are also produced in Java, and they have been examined by Dr. Treub, of Buitenzorg, who has informed the Director of the Imperial Institute that he has obtained no prussic acid from them. Samples of white *Phaseolus lunatus* beans, probably of South American origin, purchased in France, have also been examined at the Imperial Institute and found to yield no prussic acid. It seems probable, therefore, that the white beans yielded by the carefully cultivated variety of *Phaseolus lunatus* are quite harmless, and so long as trade in this product is confined to this form there seems to be no risk of danger. With regard to the other Indian form with a pink seed coat,

marked with purple spots, it is probable that this does not usually yield sufficient prussic acid to be harmful, and the dangers in using it lie in the possibility of more than the usual amount of prussic acid being developed owing to unusual climatic or cultural conditions, and in the chance of the toxic uncultivated forms of the bean being mistaken for this variety and sold in place of it."

In view of the above conclusions, the Board think that farmers, dairymen, &c., should exercise great caution before using meal made from any but the white form of these beans, while millers, dealers, and middlemen generally should be very careful to see that the beans or bean meal sold by them do not possess any poisonous qualities.

It may be pointed out that the sale of beans or bean meal possessing poisonous or injurious properties may not only result in the seller being compelled to recoup the purchaser any loss incurred by the consumption of the stuff, but the seller will also be liable to be prosecuted under the Fertilisers and Feeding Stuffs Act, 1893.

REPORT ON TUBERCULOSIS IN PIGS IN LONDON.*

A REPORT has recently been presented by Dr. G. S. Buchanan to the Local Government Board on administration in London with regard to meat of pigs affected by tuberculosis.

The object of this enquiry was to ascertain what data were available regarding the existence of tuberculosis in pigs, the meat of which is sold in London as fresh pork or used in various preparations of pork; what action is at present taken by the public authorities concerned and by their officers for the detection of tuberculosis in the carcases or viscera of such pigs; to what extent such action may be relied upon for the detection of tuberculosis in the pig either by examination at the place of slaughter or by subsequent examination of the dressed carcase; and what practice, as regards condemnation, official "seizure," and prosecution of offenders is adopted by the different authorities concerned when dealing with meat derived from pigs which have been affected by tuberculosis.

The report deals with the prevalence, causation, and prevention of tuberculosis in pigs; the appearances and detection of tuberculous lesions in pigs; the use for food of meat from tuberculous pigs; the origin of pigs whose meat is sold in London as fresh pork or used in various preparations of pork; and the method of meat inspection in London, together with some account of the official inspection to which pigs are subject in Holland, Denmark, United States, and elsewhere.

The information thus brought together indicates as regards London the incompleteness and lack of uniformity in the measures adopted by public authorities to control or prevent the importation, sale, or use for manufacture of meat of tuberculous pigs.

Dr. Buchanan points out that the need for greater uniformity is appreciated by those engaged in the pork trade, whether farmers, middlemen, or retail butchers, and has been insisted upon in repre-

* From the *Journal of the Board of Agriculture*, March, 1906.

sentations made on behalf of the trade to Government departments and local authorities. Underlying these representations, however, there has often been a more or less tacit assumption that the risk to man arising from eating the meat of pigs which have been affected by tuberculosis is negligible, with the inference that the greater uniformity of practice desired should be sought by the removal of present checks upon the sale of meat of tuberculous animals in London rather than by alterations which would increase the inspection of meat.

Dr. Buchanan considers that any step in this direction would be undesirable for many reasons, and suggests certain directions in which material progress might be made towards greater uniformity of practice in London.

He suggests that there would be many advantages in extending the system adopted in Dutch and Danish slaughter-houses of attesting the fact that a given carcase together with its viscera has passed official inspection. The official labels which at present are attached to these carcases might usefully be supplemented by stamping or branding the carcase in several places with an appropriate mark; for instance, under German meat inspection regulations, carcases of pigs which have passed official inspection are stamped (on each side of the carcase) on head, neck, shoulder, back, belly, and outside of hind-leg. The pig carcase lends itself easily to stamping. Similar marking and labelling could be easily undertaken in the case of pigs slaughtered under official inspection at Islington, when new slaughter-house arrangements are made there.

Such marking would assist meat inspectors both at the Central Market and at retail shops. At the Central Market it would be advisable from time to time to check the system of marking by careful examination of marked carcases. But as a rule attention would be given only to those which were unmarked, and much labour would thereby be saved.

There is no reason to apprehend that marking the carcase (an every-day practice on the Continent) will in any way prejudice its sale to the public, and it seems probable that retail butchers and other buyers will appreciate the security afforded by the mark. This has certainly been the case with the labels attached to the officially inspected carcases imported from Holland. The danger appears to be rather the other way, that unequal treatment may be accorded to the home producer who cannot profitably send his pigs alive to Islington, and is obliged to slaughter in private slaughter-houses. In the absence of care or knowledge on the part of men who slaughter or dress the carcase—and many of them are altogether ignorant of the significance of tuberculous lesions—and being without the advantage of official inspection, the home producer may send carcases of tuberculous animals to London with the result that (under the system of marking) they are specially looked over and tuberculosis is discovered. In such cases he would not only lose the value of the carcases, but would be at a disadvantage when compared with the foreign importer in consequence of the risk of prosecution which he would incur.

Dr. Buchanan refers in this connection to the scheme for systematic meat inspection in London which was prepared in 1898 by the Medical Officer of Health of the London County Council (Annual Report, 1898, Appendix II.). One of the most valuable parts of this scheme

was the provision at some half-dozen or more points selected with regard to railway and road traffic of "meat inspection stations." The object of these stations was to receive all butchers' meat consigned direct to London tradesmen or manufacturers and not going through the Central Meat Market. It was proposed that the carcases should there be examined, under satisfactory conditions and regulations, by veterinary inspectors with special training or experience in the inspection of meat. Convenient places for cold storage were to be attached to these inspection stations. In this report Sir S. Murphy gave reasons for believing that the cost of providing and maintaining these stations, which in part would be defrayed by inspection fees, would be comparatively small.

Establishment of such inspection stations, together with marking of meat there inspected, would go far to remove the disadvantage to the home producer referred to above, and to enable carcases of tuberculous pigs to be dealt with on uniform lines throughout the Metropolis. A further part of this scheme was that together with these inspection stations, or at certain of them, public slaughter-houses should be provided, with the intention of enabling steps to be taken to close the various private slaughter-houses which remain in London. The proportion of pork in London which comes from private slaughter-houses in the Metropolis is comparatively small, but if these public slaughter-houses were established, or if meat prepared at private slaughter-houses in London were required to be submitted to examination at the inspecting stations or otherwise, opportunity would be afforded for proper examination of pigs killed at these establishments.

Dr. Buchanan also mentions the question of dealing with condemned meat so as to permit its utilisation for human food. Suitable treatment, by way of special cooking or sterilising, would enable a large proportion of such condemned meat to be used for food, and although the product would necessarily be sold at a cheap price, some return could be made to the owner of the condemned carcase.

ABSTRACT FROM THE REPORT OF THE DIRECTOR OF THE DEPARTMENT OF AGRICULTURE IN THE TRANSVAAL.

Division of Veterinary Science.

(*a*) Contagious Diseases — Principal Veterinary Surgeon, C. E. Gray.

(*b*) Bacteriological Laboratory and Experiment Station—Government Veterinary Bacteriologist, Dr. Arnold Theiler.

Both sub-divisions have performed an immense amount of valuable work during the year; sub-division (*a*) has been engaged in a hard and unceasing struggle against contagious diseases of various kinds, whilst sub-division (*b*) has been equally busy conducting experiments

and endeavouring to provide preventives or remedies for the various diseases.

It is pleasing to be able to report that not only have the efforts of the Division to cope with the ordinary contagious diseases been attended with a considerable measure of success, but the investigations which have been conducted at the Bacteriological Laboratory with reference to the different diseases which have become more or less common in the Colony, and which constitute such a serious hindrance to its development, are very promising also.

Another gratifying feature is the way in which a good understanding is being gradually established between the Division and the farmers. The District Veterinary Surgeons who are constantly moving about their respective districts are becoming well acquainted with the country and its inhabitants and most of them are now able to make themselves understood in the Taal, whilst the farmers are beginning to appreciate their professional qualifications and to report the occurrence of disease and to consult them more freely.

After the war a number of unqualified men commenced to exploit so-called remedies or preventives for various diseases, with the result that many farmers were induced to give them a trial and suffered considerable pecuniary loss in consequence. The fact that the District Veterinary Surgeons are gradually displacing these men in the public esteem and that the farmers are relying upon them in preference to their enterprising but illegitimate brethren is one of the greatest compliments that could be paid to the Division.

A striking example of the value of a capable and alert Veterinary Division is furnished by the manner in which the presence of surra amongst a consignment of camels imported from Somaliland was detected and dealt with.

Thirty-six camels were sent from Delagoa Bay to Pretoria for the purpose of forwarding them to Pietersburg, where it was thought they would be useful for transport purposes in the low country. The animals were untrucked at Pretoria for our inspection and for a rest; almost immediately after arrival one of them died, and on making a *post mortem* Dr. Theiler came to the conclusion that death was due to some disease of the blood. On further investigation this proved to be surra. Meanwhile the whole of the herd had been kept isolated, and an examination of their blood showed that nearly the whole of them were infected and accordingly they were destroyed.

The disappointment was great, for it had been hoped that the introduction of camels would have done something to solve the transport difficulty in parts affected with Rhodesian redwater, and the loss was considerable: but there was no alternative, for had surra, which is an insect-borne disease closely related to tsetse or nagana amongst cattle, and sleeping sickness in man, been allowed to gain a footing the result might have been disastrous, and even worse than Rhodesian redwater.

This disease attacks all domestic animals, and in Mauritius, where it was imported from India during the war, it destroyed a large proportion of the live stock.

The regulations designed to prevent the introduction or spread of contagious diseases, which were published in 1903, have been consistently enforced; it has been necessary to make a few additions and amendments to them from time to time, and other slight alterations

may yet be required, but on the whole the regulations have proved workable and effective.

The organisation for dealing with contagious diseases is as follows: In addition to the principal veterinary surgeon, assistant principal veterinary surgeon, and headquarters' staff, there are eighteen district veterinary surgeons, and twelve stock inspectors distributed throughout the Colony. The district veterinary surgeons hold the diploma of the Royal College of Veterinary Surgeons or some equivalent degree, whilst the stock inspectors, who act as lay assistants to the district veterinary surgeons, are men who, in addition to a practical knowledge of live stock, have undergone a course of instruction under Dr. Theiler at the Veterinary Experiment Station on such subjects as the diagnosing of ordinary diseases, the taking of blood smears, the making of *post mortems*, inoculating, disinfecting, and so forth.

Invaluable assistance has also been rendered by the South African Constabulary; not only have the members of that force been instrumental in enforcing the regulations dealing with the movements of stock, the quarantining of infected animals, without which the whole system of contending against contagious disease would have broken down and the country would have been in a very different condition as regards disease than it now is, but they have been very useful in reporting disease and in lending a hand, when their other duties permitted, to assist the district veterinary surgeon or stock inspectors in dealing with outbreaks. In order to increase the usefulness of the force in this direction the Inspector-General very kindly allowed a number of men to attend short courses in elementary veterinary science at Dr. Theiler's laboratory similar to those provided for stock inspectors.

The controlling of contagious diseases largely depends upon the prompt notification of outbreaks, and the observance of the regulations dealing with the quarantine of infected animals and the movements of stock. The department could never employ a staff of inspectors such as would be required to ensure the observance of these regulations in a large country like this, and therefore recourse must be had to the Constabulary who, in pursuance of their duties as police, are distributed throughout the Colony and are continually patrolling the various districts, and who can therefore perform the work required of them with advantage, and with but little interference with their other duties. This being so, it follows that the more the men know about stock aud about the more prevalent diseases, and the better acquainted they are with the country and its inhabitants, the more useful will they become, and, speaking from a purely departmental standpoint, it would be a great advantage if the men stationed in country districts could undergo a short course of instruction in veterinary hygiene in addition to their ordinary training, and secondly, that their peroid of service in the force be not too short.

To assist the Department in dealing with Rhodesian redwater or East Coast fever, the most serious and difficult disease we have to contend with, advisory committees, consisting of the resident magistrate, the local commandant of the South African Constabulary, and several prominent farmers, with the district veterinary surgeon as consultant, have been formed in the various districts, with, in some instances, sub-committees in the wards of the districts.

These committees have proved useful in many ways. They have brought the Department directly and intimately into touch with the leading farmers of the different districts, with the result that the Department has acquired a better knowledge of local conditions and of the most practical and least inconvenient way of dealing with the disease in those districts, and has been able to amend or extend the regulations accordingly. The committees have also been of considerable service as educational agents; the discussions they have had with the district veterinary surgeons, together with the occasional visits of the principal veterinary surgeon or Dr. Theiler, and the correspondence with headquarters, have all served to enlighten them as to the cause and mode of distribution of the disease, and they in turn have communicated the information to their neighbours.

But, valuable as is the assistance rendered by the advisory committees and welcome as is their advice and co-operation, yet the fact must never be lost sight of that the eradication of contagious disease is, and must be, in the main a matter for the central administration.

The arguments are often advanced that since farmers have been used to stock all their lives, they should know more about it than any one else, and that, inasmuch as it is obviously to their interest to keep down disease, they should be trusted to do so; or that, if regulations are necessary, that they, as practical men and old residents in the country, should be allowed to formulate and administer them. There is a good deal of force in some of the above contentions and dangerous half truths in others. There is no doubt as to the intimate knowledge of live stock possessed by many farmers, and the opinions of these men are worthy of the most careful consideration, but, as a rule, their knowledge is general rather than particular, and they cannot be expected to know as much about individual disease as do men who have made it the business of their lives to study these diseases and to ascertain the best methods of dealing with them, and who have been provided with every possible facility in the way of books and apparatus and of animals, both healthy and diseased, for so doing.

Therefore, it follows that just as medical officers of health are best qualified to draft regulations for the control of contagious diseases amongst human beings, so we must look to veterinary surgeons to perform similar duties as regards contagious diseases of animals.

With respect to the administration of the regulations, the whole history of contagious diseases goes to show that though the co-operation of local bodies is of the greatest importance to the Central Administration both as regards advice and the execution of details, yet it is the central authority, or, in other words, the Government of the State concerned, that must be relied upon for the successful prosecution of the work as a whole, and where governments have risen to the occasion and performed those functions in a rigorous, but withal reasonable and intelligent, manner the diseases have been overcome, to the immense benefit of the agricultural community; whilst, on the other hand, where too much decentralisation has taken place the results have been very disappointing.

An excellent illustration of this is furnished by what has taken place in Great Britain and in Cape Colony. In both these countries the more virulent contagious diseases have been dealt with by the central authorities. In Great Britain they have been almost entirely

eradicated, and in Cape Colony nearly so, or, at all events, got well in hand, whereas in both countries the extirpation of scab amongst sheep, which is not nearly so deadly or so difficult a disease to cope with, has been entrusted to the local authorities, with the result that, though a vast amount of actual loss, as well as profound annoyance, has been caused by scab and the administration of the regulations, and in Cape Colony especially enormous sums of money, amounting to no less than £80,000 per annum—or more than double the annual cost of our whole veterinary division—have been spent; in Great Britain the disease still causes considerable loss and inconvenience, whilst in Cape Colony very little progress has been made, and as Dr. Hutcheon, the veteran chief veterinary surgeon of that colony—than whom no man has had more experience of dealing with diseases of animals in South Africa—recently remarked at an Inter-Colonial Conference of Veterinary Surgeons, that owing to the lax way in which the regulations dealing with scab were carried out, their position was worse than it was before the Scab Act was passed, and he went on to say: "They had spent hundreds of thousands of pounds for doing what? For bringing people to that frame of mind in which they believed it was not possible to eradicate scab. If they had an Act which could be enforced, and if they did enforce it, the disease would certainly be eradicated in a year or two. At present the whole of the colonies of South Africa were wasting hundreds of thousands of pounds annually and were not doing a bit of good; they had never seriously attempted to get rid of scab."

The Colonies of Australia and New Zealand, which possess a much greater area of land and infinitely more sheep than South Africa, and with conditions, at all events as far as the Australian Colonies are concerned, more nearly resembling those obtaining here than any other part of the world, might also be cited as an instance of the necessity for central control, and of how scab can be eradicated if the work be properly executed. In Australia the scab regulations were formally administered locally as in Cape Colony, and with the same result, for little progress was made; but when the matter was taken in hand by the Colonial Governments short work was made of the disease, and it was soon stamped out. Mr. Alex Bruce, the Chief Stock Inspector of New South Wales, who framed and carried out the successful legislation under which that colony was cleared of scab, is reported to have said* that whilst there remained a vestige of local influence in the administration of the Acts, Australia made no real headway against scab, and it was not until local administration and control were abolished, and until every candidate for appointment as Scab Inspectors had to produce a certificate of competency, and was appointed by the central authority, that the eradication of scab came in sight.

This has been the policy adopted by the Department in dealing with contagious diseases, but though it has been deemed advisable to retain the direction of affairs so largely within our own hands, yet it must be clearly uvderstood that such action has not been inspired by distrust of the farmers or by any desire to disparage their knowledge or ability, for, on the contrary, every effort has been made to benefit

* See letter by Mr. S. Rowland Timson, *Midland News*, C.C., March 10, 1904.

by their experience and to consult their convenience, but simply because the history of campaign against contagious disease the world over shows clearly and conclusively that measures for dealing with such diseases have not been efficacious when administered by local authorities, and that they have been strikingly successful when wisely administered by the central authority.

WOUNDED WAR HORSES.

In introducing a deputation to the President of the United States of America at the White House, Washington, Mr. Lawrence said: "Your Excellency has already done incalculable good to mankind in the matter of the peace between Russia and Japan; you are now asked, by a deputation which has crossed the ocean for the purpose, to do something for animals. The memorial which is to be presented to you is as follows:—

"Your memorialists submit: That the Geneva Convention, which was agreed upon in 1846, contained a provision for the protection of those who, after a battle, tend wounded soldiers, namely, that, wearing the badge of the Red Cross, they should not be fired upon; that all that is necessary to extend the same protection to those who tend wounded animals is the regarding the words "sick," "wounded," and "disabled" in the Convention as applying not to men only but to animals also; that certain additional provisions were agreed upon at a second conference at Geneva, which, though not formally ratified, were yet acted upon by Germany and France in the war of 1870; and that by the seventh clause of the original and duly ratified convention, the commanders-in-chief of the respective armies are in all future wars to decide in respect of such details as are not already resolved upon by the terms of the Convention.

"You are therefore most respectfully asked to urge the representatives of the great Powers to agree that the words "sick," "wounded," and "disabled" in the Convention shall be held for the future to refer to both men and animals, and that in future wars properly qualified farriers, non-combatants, appointed to mitigate or terminate the sufferings of wounded animals shall, by consent of the respective commanders-in-chief, if wearing the badge of the Red Cross, enjoy the same protection as is now accorded to those who attend wounded men."

Mr. Roosevelt in reply, said that he gave his hearty approval to the object of the memorial, which would be sent to the proper quarters through the Secretary of State: he himself would give it his active and practical support.

(*Annual Report of the Church Society for the Promotion of Kindness to Animals.*)

Reviews.

THE JOURNAL OF THE BOARD OF AGRICULTURE, March, 1906.

The contents of this journal always form most interesting reading for the veterinarian and agriculturist. The March number contains articles on weeds and their extermination, this time attention being especially given by the author, Mr. Percival, M.A., to the study of some common varieties of thistles. Mr. Finlayson, F.L.S., contributes an article on red clover seed and its impurities; whilst for the veterinarian the two articles of special interest are those on the poisoning of cattle by Java beans, and a report on tuberculosis in pigs in London. The former we are publishing at length in another column, as the cases occurred in Scotland, and it was considered of sufficient importance for the Board of Agriculture to instruct one of their Inspectors to investigate it.

JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, April, 1906. Published by John Bale, Sons and Danielsson, Ltd., Great Titchfield Street, W. Price, 2s.

The *Journal of the Royal Army Medical Corps* always contains original work of the highest standard, and much of it, studied from the comparative pathology aspect, is of interest to veterinarians. This month's number is no exception.

Amongst other articles is a report of the Commission appointed by the Admiralty, the War Office, and the Civil Government of Malta, for the investigation of Mediterranean fever—the particular portion this month dealing with goats as a means of propagation of this disease, being written by Major Horrocks and Captain Crawford Kennedy. The report commences by a reference to a preliminary note (which has already been published in Part III. in the reports of the Commission) in which it was shown that goats in Malta suffer from Mediterranean fever and excrete the *Micrococcus melitensis* in their milk and urine.

The present report divides the subject into the following parts:—

(1) The examination of goats living in pens in various parts of the Island.

(2) Experiments made to determine the possibility of infecting animals by feeding them on milk cultures and infected milk.

(3) Experiments to determine the modes in which the goats themselves become infected.

(4) Experiments to determine whether it is possible to destroy the *Micrococcus melitensis* by pasteurisation of the infected milk.

The examination of goats living in pens in various parts of the Island demonstrated that in the milk of a very large proportion of them the *Micrococcus melitensis* could be demonstrated quite readily, even to the extent, in some of the herds, of 40 per cent. Feeding experiments were made on goats and monkeys and the results were carefully noted, the final conclusions being as follows:—

(1) That 41 per cent. of the goats in Malta are infected.

(2) Ten per cent. of the goats supplying milk to various parts of Malta excrete the micrococcus in the milk.

(3) The excretion of microbes may continue steadily over three months without any change occurring in the physical character or chemical composition of the milk, and without the animals exhibiting any signs of ill-health.

(12) Monkeys and goats can be infected by feeding with cultures, isolated from milk, and by feeding with the infected milk itself.

(13) The incubation period seems to vary between three or four weeks.

(17) That it has not yet been possible to convey infection from goat to goat by way of mosquitoes.

(19) Pasteurising (68° for ten minutes) destroys the micrococcus in infected goats' milk.

ANATOMICAL DIAGRAM OF THE EWE. By Henry C. Wilkie, F.R.C.V.S., Veterinary Division of the Department of Agriculture, New Zealand. Published by Authority, John Mackey, Wellington, New Zealand.

Mr. Wilkie has added another diagramatic brochure to those which have already been published, this time the subject being that of the ewe.

The copyright in England has been purchased by Messrs. Cooper and Nephews, of Berkhamstead.

It consists of four figures, with the accompanying explanatory text and a large diagram, suitable for lecture purposes; it is intended mainly for the use of lecturers in elementary veterinary anatomy, and those who give lectures on first aid to farmers.

The large drawing measures 50 by 30 inches, being practically the natural size of a moderate-sized ewe.

Every plate is fully explained in simple language and the work fulfils in every way the purpose for which it is intended.

ANNUAL REPORT OF THE CHIEF STATE VETERINARIAN OF NORTH DAKOTA, AMERICA.

In the small pamphlet of some 23 pages, Mr. El Van Es, the Chief State Veterinarian, summarises the veterinary inspection work which is being done in the State of North Dakota, and from it we judge that glanders, mange, scab, blackleg, tuberculosis and rabies are the principal diseases which occupy the attention of the State Veterinarian. It is published by Messrs. Tribune, of Bismark, North Dakota.

THE TROPICAL AGRICULTURIST AND MAGAZINE OF THE CEYLON AGRICULTURAL SOCIETY.

This paper, which is mainly devoted to agriculture, has usually an article on some veterinary subject contributed by Mr. G. Sturgess, M.R.C.V.S., the Government Veterinary Inspector, and at the present time there is running through each monthly number a rather interesting series of notes, which must be of value to the planters and agriculturists of Ceylon, on the diseases of poultry. The paper is published in Colombo, by Messrs. A. M. and J. Ferguson.

Translations and Extracts.

ON THE VALUE OF RECTAL EXPLORATION IN THE DIAGNOSIS OF PREGNANCY.

THE author points out that it is often highly important to be able to determine whether an animal is pregnant or not, and a wrong diagnosis frequently causes great loss and annoyance to the owner. Most farmers, stud-grooms and herdmen have some plan of determining the point which is supposed to be infallible, but which, unfortunately, as often turns out to be wrong as right. They chiefly rely on some external symptom or sign, and, as every veterinary surgeon who has had much practice among breeding stock knows, these are most misleading, and he states that in his experience rectal examination is the only true and proper method.

The rectum acts as a glove or a sheath, through which the pelvis and uterus can be explored. A very little practice will enable the operator to detect the different shapes and sizes this organ assumes, and when gestation has advanced sufficiently, the fœtus can be not only detected but its position, size, and whether alive or dead, made out.

If the subject is a mare, usually a twitch will have to be applied, and a forefoot held up if a cow, the fingers in the nose, and the head twisted round will suffice, the rectum being previously emptied.

By depressing the hand the uterus can be felt. If the animal is not pregnant it will be only necessary to pass the hand in up to the forearm, when it will be detected, the horns extending upwards in the mare, downwards in the cow.

If the animal is pregnant the condition will vary in a primapara and a pluripara. In the first the fœtus will be felt just under the hand in the pelvis, in the latter in the abdomen, and the whole arm, up to the shoulder, will have to be introduced. The reason of this is that after several pregnancies the broad ligaments become relaxed. In the primapara the fœtus can be easily detected about the third month, but in the pluripara not till the fourth. The fœtus itself will not be felt, but the uterus is elongated, nearly double its natural size and is fluctuating. About the fifth month the body of the fœtus itself can be made out, under the hand, especially the extremity of a limb, and by a series of examinations the size, development and growth, &c., can be clearly estimated, as well as certain abnormal conditions, such as twins, abnormal growth, hydrops amnii, mummification in the uterine horn and torsion of the uterus, and precautions taken.

When reasonable precautions are observed there is no danger to either the operator or patient, and although he habitually uses this method the author has never yet had an accident, and he considers that it is only nervousness, probably combined with repugnance, that prevents its universal adoption.

(*L'Elevage Scientifique.*)

AN UNCOMMON CAUSE OF INTESTINAL OBSTRUCTION IN THE OX.

BY M. J. PARANT (AUTUN), FRANCE.

CASES of intestinal obstruction from fibrous bands "the remains of an old peritonitis," entangling the small intestine are well known to all practitioners who have to do with cattle; but so far as I am aware, obstruction by a persistent urachus has not yet been reported, and has escaped observation. Hence the following case may perhaps be of interest.

On September 10, 1905, I was called to attend a three-year-old Nivirnais ox. The patient had been working on the 8th, when he was suddenly taken with a violent attack of colic, which disappeared as suddenly as it came on, after about eight hours. The animal remained down, as if paralysed, refused all food or drink, and the bowels were dormant.

The beast was dull and listless, in a semi-comatose condition, and in spite of all efforts could not be made to rise, although he moved his hind-legs. Manual exploration showed that the rectum was quite empty and when the arm was withdrawn it was covered with blood-tinged flakes of mucus. Towards the right side of the rectum in the flank there were slight pains on pressure but nothing very marked. A purgative was given, but as it had no effect the owner the next day resolved to send the animal to the butcher. When the abdomen was opened, a portion of the small intestine was found to be greatly congested, and two lumps of the intestine, each measuring about two feet, were entangled in a white round cord about the size of a pencil that was stretched into the cavity of the abdomen. The cord only made one twist round the two lumps.

The entangled portion of the intestine presented the usual inflammatory appearance that might be expected with commencing gangrene. The cord which was attached to the umbilicus and *cul de sac* of the bladder proved to be the urachus. The bladder, instead of being globular and rounded at the anterior part, preserved its fœtal form, that is to say, it was ovoid and fusiform at both ends, measuring about 9½ by 3 ins.

When opened it contained a small quantity of blood-stained urine and the lining membrane was studded over with sub-epithelial hæmorrhagic points and fungoid vegetations, as the patient had previously suffered from hæmaturia. The anterior portion of the bladder extended into the urachus, which was still to a large extent permeable.

The urine was passed normally, and there was nothing to give rise to a suspicion that such a condition of things existed during life. Shortly after birth the urachus appears to have commenced to close near the umbilicus, but only to a small extent, remaining as a cord that united the bladder to the abdomen.

This explains why the animal would not get up, as the weight of the entangled bowel dragging on the cord and bladder caused pain. Although persistent urachus is not uncommon in oxen, there is no record of one causing a fatal consequence, hence the reason for reporting this case.

(*Revue Générale de Médecine Vétérinaire.*)

ATROPHY OF BOTH OPTIC PUPILLÆ IN A HORSE.

BY M. MATHARAN, REMOUNT DEPÔT, FONTENAY LE COMTE.

THE subject was a four-year-old artillery remount. On examining the eyes with the ophthalmoscope and the sunlight the optic pupillæ in both eyes were noticed to be oval, with the edges well and clearly defined, but blanched and without any vessels running over them, probably due to interstitial neuritis.

According to M.M. Nicolas and Fromagut, atrophy of the optic nerve is sometimes due to repeated attacks of neuritis, and sometimes congenital. In this case, from the clear outline of the pupillæ, the cause was considered to be retrobulbar neuritis of cerebrospinal origin.

(*Revue Générale de Médecine Vétérinaire.*)

CHEMICAL DESTRUCTION OF CONDENSED MEAT AND UTILISATION OF THE FAT.

BY FRANKE.

THE author recommends this plan where regular destructors are not available, as it is cheap, and an ordinary fire can be used. A 3 per cent. solution of caustic soda is used. The meat is soaked for twenty-four hours in the alkaline solution, and then placed in a large copper containing the soda, which is boiled over an ordinary fire for three or four hours till the contents are liquefied and dissolved. The contents are drawn off by a tap at the bottom, first albuminates, second gelatine, and lastly the fat, which is not saponified, as the alkaline solution is too weak.

(*Zeitschrift für Fleisch. und Milchhygiene.*)

NOTES ON OSSEOUS CACHEXIA.

BY M. L. GRANDEAU.

THE custom of adding phosphate of lime to the food of farm stock is on the increase, and Dr. Max Passon, in the *Journal für Sandwertschaft*, vol. xxxiii., 1905, reviews the experiments and observations made during the past quarter of a century.

In 1873 Weiske and Wild fed animals on exactly the same quantity and quality of food, except that to one lot phosphate of lime was added, the other was without it. After a time all the animals were slaughtered and their bones analysed, but there was absolutely no difference in the quantity of phosphorus in any of them. Hofmeister repeated and confirmed the experiment, which proves that the addition of phosphates to the food is useless when they naturally contain a proper proportion of phosphoric acid. According to Hofmeister the assimilable quantities of phosphoric acid and lime are

not in the same ratio with the two substances when they are in combination with each other in the form of phosphates, the co-efficient of phosphoric acid being 35·5 per cent., whereas that of lime is only 23·8 per cent.

In 1893 Raudnitz showed that the absorption of calcareous salts chiefly takes place in the duodenum ; and that, whereas the carbonates are only absorbed after being dissolved by the gastric juice, phosphate of lime is independent of it.

It is well known that the addition of phosphates to the food of young animals promotes the growth of the skeleton, but Graffenberger has shown that even when given for a long time to pregnant animals, neutral phosphate of lime has no influence on the development of the fœtus.

When the food is deficient in phosphates and lime salts, then the addition of them is of great utility. Forster fed a dog on food containing a sufficiency of nitrogenous and fatty constituents, but no minerals. During the experiment the loss in lime was 13·57 grammes, and phosphoric acid 17·3 grammes, all of which came from the bones; indeed, an animal that is fed on food from which lime salts is entirely absent dies from starvation as quickly as if he got no food at all.

In 1881 Lunin showed that the sulphur in the albumin is changed in the body into sulphuric acid, and if the food is wanting in lime salts the sulphuric acid is unable to find the basis necessary for its saturation; it therefore falls back on the lime in the tissues, and the animal dies in a very short space of time. Free phosphoric acid added to the food acts like sulphuric, and decalcifies the tissues (Weiske).

Some interesting experiments were made on pigs at the Wisconsin, U.S.A., Experimental Station. One lot were fed exclusively on maize and water, with the addition of a little salt; a second lot on exactly the same food, with the addition of a certain amount of bone dust and wood charcoal. In order to increase the live weight by 50 kilos., the first lot required 319·500 and the second 255 to 246 kilos. of maize, proving that its assimilation was greatly arrested by the addition of the phosphate. Also after slaughter the bones of the second lot were much firmer and more compact than the first, the femurs of the first breaking under a weight of 150 kilos., whereas 340 kilos. were required to break those of the second batch.

The author points out that rachitis is a juvenile disease, whereas osseous cachexia or osteomalacia is one of adult or old age, but that they both greatly resemble each other, being characterised by a diminution in the quantity of salts in the bones. There is almost unanimous agreement of opinion that the disease is due to errors in feeding, particularly in consuming forage that is deficient in phosphoric acid and lime salts. Cantiget has shown that osseous cachexia is only seen where the soil is poor in phosphoric acid and lime salts, and, consequently, the forage deficient also. If the land is dressed with phosphates, the disease disappears.

There are other predisposing causes, such as prolonged milking, gestation, and any other debilitating cause, so that it is not common in oxen, and, as has been proved by Bongarty in 1894, it is most often seen in dry seasons. This writer studied the disease in 1894 (Fül-

hing's *Landw Zeitung*, 1894), when it appeared after the exceedingly dry summer of 1893. The forage was analysed by Stutzer, and shown to be deficient in phosphoric acid, the normal amount of which was 0·80 per cent. in beetroots, 2·50 in straw, 4·30 in hay, but which had fallen to 0·43, 0·85, and 2·92 per cent.

Seelhorst (*Journal für Sandw*, 1900) makes similar observations, and O. Kellner (Sachs, *Landw Zeitschrift*) shows that hay and straw harvested from farms where osseous cachexia has been prevalent is naturally deficient in phosphoric acid.

The importance of phosphoric acid and lime is universally admitted, and they are present in variable quantities in almost every tissue of the body; therefore it is indispensable that they should be supplied in proper proportions, if possible, naturally in the food, but if not, added to it artificially.

The most valuable are what are commercially termed precipitated phosphates, and are a mixture of tri- and biphosphates of calcium. They are formed by precipitating with milk of lime the phosphates of bones dissolved in hydrochloric acid, and their value depends on the amount of bicalcium present.

Sehmann, V. Goheen, Hofmenter and Weister have shown that phosphoric acid and the lime in precipitated phosphates are assimilated by animals, but give no indications as to the proportions in which this takes place. Also, they do not mention the comparative value of other commercial phosphates, such as degelatinised bone dust, animal charcoal, &c.

Kellner has recently made some important observations at the Government Farm at Möckern on these points ("Ueber die Assimilation des Kalkes und die Phosphorsäure aus verschiedenen Kalkphosphaten dorch, Machsende Tiere, *Verochs Stationen*, vol. lxi., 1905), he says: In the first series of experiments made in 1903 two sheep, 12 months old, were used. The food was carefully analysed and weighed, and the urine and fæces collected for analysis.

The experiment was divided into six stages, during which the animals were given identically the same ration. The first and last stages were experiments to determine the amount of the given quantity of food that could be used up by the system. During the second, third, fourth and fifth stages the sheep had a variety of phosphates given to them representing 5 grammes of phosphoric acid per diem.

The two sheep, at the beginning of the experiment, weighed 49·4 and 48·2 kilogrammes respectively, and 59·4 and 52·1 at the termination.

During the first and sixth stages, when there were no phosphates given, sheep No. 1 lost 0·543 grammes of phosphoric acid and 1·254 of chalk; No. 2 lost 0·162 grammes of phosphoric acid and 0·801 of chalk. This confirms Foster and Voits' observations, viz., that when the food is poor in the two constituents it is made up from the bones and muscles.

During the second stage 12·44 grammes of calcium triphosphate were added to the food, that is to say, about 5 grammes of phosphoric acid and 6·102 of lime: about half of this was consumed, viz., 1·773 grammes of phosphoric acid (35·5 per cent.) and 1·883 grammes of lime (30·8 per cent.).

In the third stage 11·566 grammes of calcium biphosphate were given, equivalent to 5 grammes of phosphoric acid and 3·912 grammes of lime. The quantities consumed were 1·299 grammes of phosphoric acid (26 per cent.) and 1·305 of lime (33·4 per cent.).

In the fourth stage 14·881 grammes of degelatinised bone dust, representing 5 grammes of phosphoric acid and 6·707 grammes of lime, were given; 0·653 of phosphoric acid (13·1 per cent.) and 1·459 of lime (21·8 per cent.) were consumed.

In the fifth stage 12·213 grammes of calcined bone dust, representing 5 grammes of phosphoric acid and 6·557 grammes of lime, were given, 0·708 of phosphoric acid (14·2 per cent.) and 1·200 of lime (18·3 per cent.) were accumulated.

These experiments prove that degelatinised and calcined bones are the least, and the tri- and biphosphate of calcium the most, valuable, the proportion of the former standing at 35 the latter 26 per cent.

These results are somewhat surprising, as at first sight it would be thought that the biphosphate of calcium would be the most easily accumulated; but in No. 3 the animals were getting 2·2 grammes of lime less than in No. 2, and possibly the small amount of phosphoric acid accumulated is due to the low percentage of lime in the food.

With a view of testing this explanation Köhler undertook a fresh series of experiments in 1904 with a six-months'-old lamb, dividing the experiment, as in the former case, into six stages. The food was not changed, but it contained both more phosphoric acid and chalk than on the previous occasion.

In the second stage 7·5 grammes of triphosphate of lime, representing 3 grammes phosphoric acid and 3·69 of lime, were added to the food. The quantity assimilated was 1·16 of phosphoric acid (38·6 per cent.) and 1·31 of lime (35·6 per cent.).

In No. 3, 7·2 grammes of biphosphate and 2·4 of lime were used, 1·05 of phosphoric acid (35 per cent.) and 1·23 of lime (50·8 per cent.) being assimilated.

The balance is in favour of the triphosphate, but is less than in the first experiment. The proportion of biphosphate is much lower, probably on account of the larger proportion of lime salts in the food.

In No. 4 the lamb was given 7 grammes of biphosphate, representing 3 of phosphoric acid and 2·42 of lime, also 7 grammes of lactate of lime. The quantity of phosphoric acid assimilated was 1·64 grammes (54·2 per cent.) and 2·07 lime (55·9 per cent.).

These results show that the minima of phosphoric acid and lime were absorbed when contained in degelatinised and calcined bone, and that they are not of very much practical value for feeding purposes. It also shows that the assimilability of phosphoric acid and lime in the tribasis form is greater than has been generally supposed.

The low degree of assimilation of the biphosphates is no doubt due to the small amount of lime salts in the food, or the addition of a soluble lime salt considerably improves it, and the result of the experiment shows that the precipitated phosphate is the most economical.

Precipitated phosphate is prepared by decomposing bones with hydrochloric acid and treating them with milk of lime. It contains 38 to 40 per cent. *by weight* of phosphoric acid, and its market price is about 13 francs per 100 kilogrammes. It is not poisonous, even in

large doses, in fact, certain farmers give as much as 2 kilogrammes daily to fatten oxen.

The dose varies. In the case of healthy animals that are getting food deficient in phosphates, the following is recommended: 15 to 20 grammes for sheep; calves, 50 to 60; pigs, 80 to 100; oxen, 150 to 200 per diem; but if osseous cachexia is threatened, larger quantities may be prescribed.

(*Journal d'Agriculture pratique.*)

COMPLICATIONS AFTER THE OPERATION OF TRACHEOTOMY.

BY PETSCHELT.

THE author divides them into three classes:—

(1) *Ulceration of the Trachea.*—This may be caused by prolonged or undue pressure of the tube on the inside of the trachea. It is generally seen in front, either above or below the opening, and in certain cases the adjacent rings are implicated in the necrosis and a bloody, ill-smelling discharge is given off. Trendelenburg has pointed out that a silver tube, where it comes in contact with the ulcers, turns black from the formation of sulphite of silver.

Ulceration is a serious matter, as it causes complications, and a properly adjusted india-rubber or gutta-percha tube should be used.

In certain cases ulcers will be found inside the trachea on the posterior face, caused by violence, or clumsiness in putting in the tube.

(2) *Tumour on the Mucous Membrane.*—Growths, termed by the author "granuloma," form round the orifice and "fibro-epithelioma" develop where the arms of the tube come in contact with the mucous membrane. They interfere with the passage of air, especially when below the opening, and a surgical operation is necessary. The author has seen one the size of a hen's egg.

(3) *Inflammation with Hyperplasia and Adhesion of the Rings.*—Irritation from an ill-fitting tube will cause inflammation and ecchondrosis of the neighbouring rings. The growths extend inwards, blocking up the trachea and causing the neighbouring rings to unite together. The tube should not be too large, and opening made large enough.

(*Monatshefte für Thierheilkunde*, September 30, 1905, vol. xvii., p. 1.)

ABORTION AND STERILITY IN COWS FROM CONTAGIOUS METRITIS AND VAGINITIS.

BY J. D. T.

ABORTION and sterility have lately been noticed from these causes in several herds in Belgium, and since the month of October, 1904, the author has met numerous cases of animals not "holding" even after several visits to the bull, and he has come to the conclusion that it is due to their suffering from contagious metritis or vaginitis.

Symptoms.—There is but little derangement in the general health of the cow, which feeds as usual, but what the owner notices is that she is frequently in season, this is what usually attracts attention, but the local symptoms cannot be well mistaken. In addition to acute catarrh, the vaginal mucous membrane is a dark red colour and more or less smaller than normal, being studded over with small tumours about the size of a pin's head, these are more numerous at the lower part. They can be easily detected by opening the vulva and standing the cow so that the sunlight falls obliquely. There is a slight discharge from the part, which in some cases is clear, in others thick and purulent.

When first affected there is slight swelling of the lower portion of the lips of the vulva, but this only lasts for three or four days, and the author thinks that although only the entrance to the genital passage is implicated that this catarrh always causes sterility. Zschokke, however, attributes it to spasm of the neck of the uterus. The symptoms gradually lessen and in a fortnight or three weeks the catarrhal condition becomes chronic and enters into the second stage, when it is likely to extend to the uterine mucous membrane and give rise to chronic endometritis.

The highly contagious nature of the disease has been known for many years, and it is chiefly transmitted by the bull, but it can also be conveyed by the hands of the milkers, dressings, &c., in the cow-shed.

Results of Contagious Vaginitis.—In addition to the discharge, the parts are so sensitive that they contract during the act of copulation and prevent the male organ penetrating. There is also spasm of the neck of the uterus.

Barren cows are frequently affected with fluor albris, having a muco-purulent white discharge, and in the author's experience this is indicative of chronic metritis. Even if such animals do become pregnant they generally abort, the time they carry the calf depending on the extent of the diseased surface, varying from the sixth or seventh week up to the seventh or eighth month.

Vaginal catarrh is readily cured, but when it spreads to the uterus it is most obstinate.

Treatment, to be of any practical use, must be:—

(1) Capable of being carried out by the owner or his servants.

(2) Applicable to all animals.

(3) Inexpensive.

Intravaginal injections of antiseptics and astringents, such as 2 per cent. solutions of alum, 1 of ichthargan, and 1 to 2 of bacillol or creolin have been tried, but are not always satisfactory, or they do not remain in contact with the parts long enough.

Riersterhok recommends the daily introduction into the vagina of a bougie of ichthyol and cocoa-butter, 1 to 10. The bougie is about 4 in. long by $\frac{1}{4}$ in. thick, and is passed by the finger as far as possible into the vagina, the lips of the vulva being held together till it melts, which will take place in from two to three minutes. The bougies should be used once daily, and five to six applications are generally sufficient in a case of acute vaginitis.

In a neighbouroood where contagious vaginitis is prevalent the following preventive measures should be adopted:—

(1) All cows should be carefully examined before being put to the bull.

(2) After serving, the bull's sheath should be carefully washed with a 1 per cent. solution of bacillol or creolin.

(3) Bulls suffering from gleet of the sheath should not be used.

(4) On a case of vaginitis occurring all cows in the herd should be carefully examined and isolated, and on the discovery of a case every cow should have the vulva, tail, and thighs carefully disinfected every other day with a 1 or 1½ solution of bacillol.

(*Tydschrift voor Veearteeniskunde*, No. 1.)

NOTES ON THE PRINCIPAL TUMOURS IN THE HORSE.

BY NEUHAUS.

THE author bases his observations on the table published by Fröhner in 1902. Out of 150 growths that were microscopically examined, Fröhner found 41 sarcomata (28 per cent.), 30 botryomycomata (20 per cent.), 20 fibromata (13 per cent.), 20 carcinomata (13 per cent.), 8 cicatricial (5 per cent.), 8 keraphyllocele (5 per cent.), 8 papillomata (5 per cent.), 4 adeno-fibromata (3 per cent.), 4 lipomata (3 per cent.), 2 osteomata (1·5 per cent.), 2 atheromata (1 per cent.).

He then goes on into a detailed study of the three chief types:—

(1) *Fibromata.* — There are two sorts, soft and hard, depending on the predominence of the cellular or fibrous elements. Very often these tumours are associated with connective tissue neoformations and form-mixed tumours such as fibro-sarcomata, fibro-lipomata, &c.

They are usually connected with the skin and subcutaneous connective tissue, but they are also found on the mucous membrane in the form of polypi. They are benign, and are only a disfigurement unless they are situated at the upper part of the air passages, when they interfere with respiration, and a surgical operation is called for.

They differ from malignant tumours in their situation, denseness, smooth surface and circumscribed growth.

(2) *Sarcomata.*—These are the most common. Fröhner gives them at 28 per cent.; Johne and Casper at 47 per cent. According to Casper the small round-celled variety is the most frequent in animals.

They are generally found on the eyes, eyelids, bones of the head, maxilla, glands of the neck, head and breast, thyroid gland, mammæ and testicles.

They rapidly invade the tissues, more quickly the soft than the hard ones, and it is impossible to determine the age of the growth by its size. They are malignant in the highest degree.

(3) *Carcinomata.*—According to Fröhner these are not so common as is generally supposed, about 13 per cent. Casper puts them at 22 per cent., and out of 27 he found 4 in the kidneys, 5 in the mammæ, 3 in the mouth and 3 in the testicles.

The stratified epitheliomata are the most common. Cancer of

the horn of the frog is characterised by a papillomatous growth from the sensative structures of the frog-sole, &c., and it is commonly supposed to be of microbean origin. It consists of hyperplasia of the sensation structures with hypertrophy of the papillæ and proliferation of the Malpighian cells, and if it is not stopped the frog is transformed into a soft decomposing mass. The longer and more irregular the growths are, and the more profuse and foul-smelling the discharge, the worse the prognosis.

(*Deutsche Tierarztliche Wochenschrift.*)

RENAL CALCULUS IN THE COW.

BY J. KOWALEWSKY.

THE case occurred in an animal slaughtered at the public abattoir. The kidney was normal in size, but had several patches of ecchymosis on its surface, in several places the lobes were smaller and hard. There were a number of confluent nodules on the surface from the size of a pin's head to a grain of millet. Several calculi were recognised by the touch.

When incised the corticular substance was pale in colour, with hollow depressions in the substance lined with a dense connective tissue, in which were a number of differently shaped calculi about thirty in number. The largest weighed about 30 grammes, and another 12 grammes. They varied in size from a cherry to a millet seed. The largest was branched and bronze in colour. It was composed of sulphate of calcium, uric acid and leucine.

(*Archyw Wietierynarnyh Naouk.*)

PROGRESSIVE BULBAR PARALYSIS IN THE HORSE.

BY PROFESSOR FRÖHNER, BERLIN.

IN human medium this condition of the medulla is recognised consisting of degenerative atrophy of the facial, hypoglossal and spinal motor centres. A similar condition is very rare in the horse, but the author has seen one case, which he reports.

The patient was a mare 15 to 18 years of age, which for a fortnight had been feeding badly and losing condition. The lips were paralysed and hanging down, and the food was taken up by the teeth ; mastication was performed with difficulty, the food being lodged between the teeth and cheeks. The pharynx was paralysed and there was difficulty in swallowing. The tongue was atrophied and hung out of the mouth. The affected parts, however, retained the power of sensation. The nostrils were retracted and the respiration loud and roaring. Eyes normal, muscles of the loins and quarter atrophied.

The animal was destroyed, but, unfortunately, a *post mortem* could not be made.

(*Monatschefte für Thierheilkunde.*)

NECROSIS OF THE NASAL CARTILAGE IN A HORSE.

BY PROFESSOR CADIOT.

THE animal was a bad stumbler, broken-kneed, and always coming down. He had a large swelling on the nose, particularly on the right side, from which there was a purulent discharge. The submaxillary glands were the size of a hen's egg, hard, adherent to the jaw, but not to the skin; they were larger on the right side than the left. The Schniderean membrane in the right nostril was thickened and the conjunctiva injected. About three inches up the nostril was a round red granulation the size of a pea with a fistula in the centre from which pus escaped. Under the membrane of the left nostril there was a collection of pus, and the septum of the nostrils was perforated, communicating directly with the fistula. The animal was cast, the fistula opened and the pus evacuated; the part being disinfected with a warm solution of permanganate of potash and dressed with tincture of iodine. A cure was affected in a few weeks' time.

Necrosis of the nasal cartilage was not recognised for a long time, being attributed to glanders or chronic inflammatory affections of the nostrils. It was first recognised by Renault, in 1854, who records three cases. It is also mentioned by Burreau and H. Bouley. The author publishes some cases in his work (*Etudes de Pathologie et de Clinique*) on necrosis of the nostrils and the septum.

It is always traumatic, from blows on the lower part of the face, bites, or other injuries, such as penetrating wounds, with or without fracture of the bones. It may be caused by infection supervening on the formation of an abscess, and if caused by a wound to one of the cartilages there is great pain. The skin on the verge of the nostril and the mucous membrane become hard, dry, and perforated with fistulæ giving exit to a purulent discharge. The submaxillary glands are hard and enlarged, as in glanders, but the opening of the fistula being visible the true nature of the injury can be diagnosed. The prognosis is bad.

The sinuses must be laid open freely and antiseptic dressings used. It is usually necessary to throw the animal. Mild antiseptic dressings should be used and the animal can be marked; and although a cure takes place it is not for a long time.

(*Recueil de Médecine Vétérinaire.*)

DENTAL CARIES IN THE HORSE.

BY SCHMIDT.

AS a rule caries in the teeth of the horse is superficial, deep-seated disease, as seen in man, being rare. It commences in the cement which surrounds the sides of the teeth but which is absent from the top. If the disease commences from this portion it first starts from the cement which is compressed between the reflections of the enamel. The author has never seen a case in which it originated from the enamel of the crown.

The naked eye lesions are changes of colour, the diseased portions being black or brown, with cavities that are a certain depth but which seldom are sufficiently so to reach the dental pulp.

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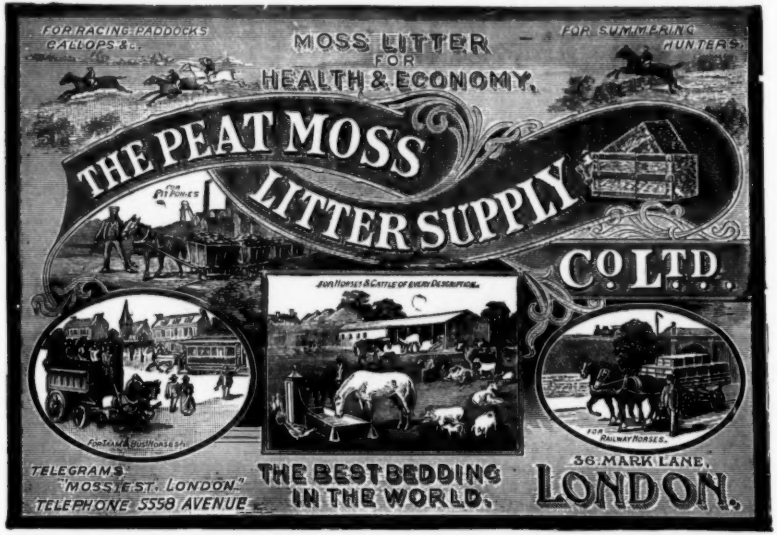
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The "COUNTY GENTLEMAN," *April* 1, says: "Chief among the merits of Peat Moss are the ease with which it is stored; the small danger it offers as regards fire compared with Straw; non-conductivity; the great powers of absorption; its antiseptic properties, and the ease and advantage with which it can be used as Manure in town gardens and in the country."

The microscopic lesions are transverse striation of the prisms of the enamel, followed by softening and complete destruction. The canaliculi in the dentine are enlarged and run together, forming cavities that are filled with decomposing *débris* and micro-organisms; in bad cases there being complete destruction of the tissue.

The author has studied the bacteriology of the subject and comes to the conclusion that in the horse the disease is due to a multitude of organisms, and is not specific like in man. He isolated two organisms, one a staphylococcus and the other the hay bacillus (*Bacillus subtilis*) which is normal in the mouth of the horse.

(*Monatshefte für Thierheilkunde.*)

PERSISTENT PUPILLARY MEMBRANE IN A HORSE AND A CAT.

BY PROFESSOR SCHEMMEL.

As is shown in the embryo, the anterior chamber of the eye is divided into two parts by the pupillary membrane (Tunica vasculosa letis) which is stretched over the pupillary opening. It contains a number of vessels derived from the hyaloid artery, and normally both it and the artery are absorbed before birth.

In certain rare cases, however, it remains, either entire or partially. In this latter case it may be absorbed in process of time, but generally some fragments remain, either adherent to the iris, or floating free in the aqueous humour. A case of complete membrane has not yet been recorded in the domestic animals.

The author reports two of partial remains in a horse and a dog. The horse was 10 years old. Vision was normal. The pupil appeared to be obstructed by what looked like granules of soot, and after the instillation of atropine it was seen that there was a large rugged cord stretching across the pupil from above downwards.

The dog was 18 months old and had about a dozen fine threads across the pupil radiating from a common centre, like the spoke of a wheel, giving the pupil the appearance of a striated cataract.

In both cases the eye was examined by the ophthalmoscope, but no alteration in the fundus could be detected.

(*Oesterreichische Monatshefte für Thierheilkunde.*)

ALTERATION OF THE BONES OF THE FOOT IN CANKER.

BY FROHLICH.

In a long and lucid paper containing numerous illustrations the author gives the following conclusions:—

In old-standing cases the bones of the foot become implicated and can be divided into two classes:—

(1) A retrograde process generally confined to the lower part of the sides of the pedal bone.

(2) A progressive process always confined to the plantar surface.

In the first class there is cellular infiltration and increased vascularity of the sensitive tissue, particularly the periosteum. There are giant cells invading the bony tissue, with increase in size of the Haversian canals. These changes are more noticeable on the surface of the bone, on which are a number of grooves corresponding with the dilated canals. It is impossible to distinguish the line of demarcation between the sensitive structure and the bone.

The sharp edge at the toe of the horse is absorbed and rounded, the wall porous, with large cavities in its substance and covered with osteophytes. In many cases there is a zone of healthy tissue at the toe.

In the second class the sensitive sole is implicated, especially the deeper layers. In these cases there is increased vascularity and cellular infiltration, especially in the neighbourhood of the bone, where the cells become rounded. As the case advances the cells become triangular or stellate, especially on the surface of the bone.

There is hypertrophy of the lower portions of the plantar surface of the bone, but the articular face usually remains healthy. There are numerous small osteophytes, especially round the edge of the articular surface.

These lesions originate in periostitis. The author points out that the deep layer of the sensitive tissues is in reality periosteum, and that the bony formations are in reality periostitis, the atrophy that takes place being the result of pressure connecting with rarefied osteitis.

(*Monatshefte für Thierheilkunde.*)

WOUNDS IN THE UDDER.

BY M. R. BISSANGE, ORLEANS.

WOUNDS of the udder, which are common in the cow, are usually due to foreign bodies in the litter, dog-bites, brambles and thorns, or from stable forks. The gravity of the injury depends on the depth, seat, and state of lactation.

If they are slight only the skin and subcutaneous connective tissue are injured, but if deep, the gland structure is implicated and mammitis and suppuration set in. When in full milk such wounds heal with difficulty, but when the cow is dry they do so readily with little or no attention. Punctured wounds extending to the sinuses cause fistula, from which there is a continuous flow of milk, and these are often seen after wounds on the lower portion of the gland, in the vicinity of the teat or on the teat itself; but if at the upper part, even if they are deep, they seldom give rise to such complication, on account of the thickness of the tissue and small size of the canals.

Shallow wounds generally yield to ordinary antiseptics—boracic solutions, oxygen water, or peroxide of zinc—but care should be taken to use inodourless applications, or the milk will be contaminated, and the cow should be prevented licking the part. With a recent wound in a milch cow active treatment must be had recourse to without delay,

or the gland will be infected. The part should be carefully washed with a disinfectant and sutured in two layers. The deep one should be catgut, the wound being powdered over with oxide of zinc or tannoform, and then the external one of silk, a layer of collodion and lint being applied.

A milk syphon should be inserted for three or four days, and can be kept in position by a couple of threads fastened to the udder by pitch or collodion. The syphon must be carefully disinfected, either in the flame of a lamp or boiling water, or the gland will become infected. The cow should be kept tied up from the others, or they will lick the wound, and a good clean bed provided.

The udder should be kept suspended in a properly fitted linen sling and great care taken that it is kept clean, the sling being frequently changed.

If these precautions are taken and this line of treatment adopted, the author has found that there will be a considerable number of successes.

(*Revue Générale de Médecine Vétérinaire.*)

LYMPHANGITIS IN THE OX.

BY LIÉNAUX.

THE author reports on the pus from two cows and an ox suffering from lymphangitis or pseudo-farcy. In the first two cases the material was sterile. In the third, taken from the tumours along the lymphatic vessel, the staphylococcus and the Preisz-Nocard bacillus of caseous suppuration were both found, but not the special streptothrix.

M. Liénaux comes to the conclusion that in the ox the bacillus of caseous suppuration causes lymphangitis with abscesses along the course of the lymphatic vessels, and that in the ox it is only pustular dermatitis complicated with lymphangitis. The seat of the disease is on the limbs, which, being exposed to the weather, accounts for the difficulty with which they heal.

M. Liénaux considers that there can be no doubt that the so-called bovine farcy of France is different to the disease that is prevalent in Guadeloupe and Mauritius, and that the term "ulcerative lymphangitis," as used with the horse, is not applicable to the ox, in which animal, when the abscess bursts, it heals up spontaneously, and does not ulcerate.

The only treatment of any avail is to open the abscess, curette he part, and excise the diseased tissue.

Although the disease is often seen in a byre, it does not seem to be contagious.

(*Annales de Médecine Vétérinaire.*)

TREATMENT OF TRYPANOSOMIASIS BY ARSENIC AND TRYPANROTH.

BY A. LAVERAN.

THE author studied the question on two dogs suffering from "dourine" at the stage when there was swelling of the sheath and abdomen, with the trypanosoma in the serum.

In the first dog the dose was 0·012 gramme of arsenious acid and 0·20 of trypanroth. The œdema disappeared, and a month afterwards 8 cc. of blood failed to infect rabbits.

In the second dog treatment took longer.

The cures were definite, but there was no immunity.

(*Comptes Rendus du Séances de l'Académie des Sciences.*)

A NEW METHOD OF TESTING THE PURITY OF MILK BY THE ABSENCE OF AMMONIA.

BY TRELLAT AND SAUTON.

THE presence of ammonia in milk is determined by the formation of nitrate of iodine, and the authors have detected it in a large number of samples of milk supplied to Paris. Milk from healthy cows that are properly kept never contains ammonia. The authors have inoculated samples of sterile milk with various organisms, and find that ammonia is given off, acetic, butyric, and lactic ferments. If dirty water is added, or the milk is kept in dirty places, there is always a reaction.

The absence of ammonia is not a proof that the milk is not contaminated, but its presence, particularly in any quantity, is that it is.

The test consists of adding 10 cc. of a 10 per cent. solution of trichloride of iodine to 10 cc. milk. A precipitate is at once thrown down. The solution is filtered, and pure milk of lime, 3 per cent., added, till a black precipitate (nitrate of iodine) is formed, which disappears with an excess of the reagent.

(*Comptes Rendus de l'Académie du Sciences.*)

OSTEOMALACIA IN TONQUIN.

BY M. J. SOURREL, VETERINAIRE EN SECOND, 7TH HUSSARS.

DURING a residence in Tonquin, from 1901 to 1904, the author had ample opportunities of observing the disease known as osteomalacia in Soutay, the delta of Tonquin, Dap Caw and Haiphong; and as the matter has lately given rise to much discussion as to the nature and causes, he thinks his observations may be useful.

The disease appears to be extensively spread over Asia and Africa. In Tonquin it has been studied by Germain and Pecaud, and it is known in British India. In Africa it has been recognised in Mada-

MOLASSES AND MOLASSED FOODS.

"Crude molasses contains a considerable percentage of both soda and potash salts, and if given in large quantities **they have a noxious effect, giving rise to both bowel and kidney disturbances.**"

"Dr. J. Augustus Voelcker, M.A., B.C., Consulting Chemist to the Royal Agricultural Society of England, in his report on the Woburn Feeding Experiments with molasses, 1900-1901, to the Royal Agricultural Society of England, vol. lxii., p. 301, also states:—

"'There is, however, with its use (the use of Molasses), **a tendency to looseness in the animals,** which must be checked by not giving it in too great a quantity. One pound per day of Molasses among four bullocks was found to be about the limit.'"

"Sugar (molasses or molassed) foods **have the detrimental properties of molasses** in proportion to their contents of sugar."

MOLASSINE MEAL.

"In the form of Molassine Meal th humic product enters into combination with these salts, **neutralising them and rendering them inert, so that the danger of feeding on large quantities of crude molasses or sugar is avoided.**"

"It seems at once to fatten and harden the animal."

"There is little doubt that in a short space of time it will become, in spite of prejudice, the staple food of all classes of horses."

"The process of manufacture is a patent and requires special machinery.'

"As a therapeutic agent **Molassine Meal undoubtedly has a healthy action on the bowels, aiding digestion** and keeping the patient free from worms."

"The humic acid counteracts the ill-effects of the potash salts, and **this danger is avoided in the combination called Molassine Meal.**"

"I have found, on high authority, that it (Molassine Meal) is a great tonic and strengthener, **enabling animals to do the heaviest kind** of work and maintaining them in good condition, **replacing equal quantities of oats, beans, maize, &c.** It is an appetiser, and aids in the easy digestion of other foods. It is, itself, easily digested, and **renders a horse thoroughly 'fit.'**"

"In addition to its hygienic properties, which have been described, **it increases the secretion of milk,** also it regulates the digestive functions."

"Allows damaged forage being used up that otherwise would not be eaten.

"The fæces of animals fed on Molassine Meal are nearly odourless as compared with those of others that are getting ordinary food. **In pigs this is most evident, and is of considerable importance** when these animals are kept in towns or villages."

Extracts from an article in the "Veterinary Journal," May, 1905, by Colonel J. A. NUNN, F.R.C.V.S., F.R.S.E., D.S.O., C.I.E., Army Veterinary Department.

[SEE NEXT PAGE.

The Wonderful Merits of

MOLASSINE MEAL

PROVED IN THE

High Courts of Justice.

INFRINGEMENT OF PATENTS.

Mr. JUSTICE WARRINGTON, in giving JUDGMENT, said:—

"It was found that **molasses as a food for cattle could not be used safely,** though it had some very good effects, because of the existence in it of potash salts, which had a deleterious effect on the stomachs of the animals. The inventor said he got over the difficulty by using molasses in combination with peat, by which means he partially got rid of the salts, or converted them into non-deleterious substances. In his opinion, having heard the chemical evidence for this Company, the owners of the patent, he was satisfied that the statement in the specification that the **peat had a chemical effect on the molasses, which prevented it from being so deleterious,** was true.

As most of the imitation Sugar Foods are named to begin with "MOL," it is important that buyers should see that they are having MOLASSINE MEAL, otherwise they suffer loss through bad results in feeding and financial loss themselves.

"Then the last defence which he need deal with was the objection that the Patent is not useful. That had been, he thought, abundantly disproved by the veterinary evidence he had heard that morning. . . . Since this patent it is possible and advantageous to give a horse as much Molassine Meal as would cause him to eat three pounds of molasses.

Special attention is paid to quality. A selection of the finest Moss obtainable from the Yorkshire Moors is used, which is far superior to any other Moss in the world, and the supply of which is controlled by the Proprietors.

"Then he had the further evidence of Prof. McLauchlan Young, F.R.C.V.S., F.R.S.E., F.R.P.S., F.Z.S., who had made some experiments—not for the purposes of this trial—with various animals in Scotland during last year, and the result of those experiments is, that the food so compounded . . . **is very valuable as a nutritious food."**

BUYERS SHOULD INSIST UPON HAVING the Only Sugar Food which may be given safely to Animals in large quantities.

Manufactured by HENRY TATE & SONS, Ltd., London and Liverpool.

Sold by all Grain and Forage Merchants, and

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gascar (Charon and Theroux), the Cape Colony, Transvaal (Theiler), and Cameroons (Ziemann). In Europe sporadic outbreaks of osteoporosis (bran sickness) are probably the same disease.

Symptoms.—The symptoms can be classified into three divisions: (1) The period of invasion; (2) period of deformation; (3) termination. This division is quite arbitrary; the duration of each stage is indefinite, and the transition from one to the other is not always apparent.

(1) *Period of Invasion.*—The first symptoms appear at a variable period, between six months and two years; after the importation of the animal into the country they come on gradually. In the small native horse they come on about the time when they are first worked. The animal is lame, very weak, and the difficulty he has in moving first attracts attention.

(*a*) *Lameness.*—Any of the limbs may be attacked to a variable degree, but in the earlier stages the lameness is characteristic, as it is impossible to locate it in spite of the most careful examination. It is of a shifting nature, at times disappearing, to return in the same or another region. In some cases, however, it can be localised in the upper joints.

In some cases there are all the appearances of laminitis, but without any of the characteristics of inflammatory action. These cases are generally seen in the small native horse, when he is worked under a heavy weight, the symptoms being those of laminitis, but without inflammation. In reality, it is the bones of the feet that are disorganised.

(*b*) *General Condition.*—There is not at first anything definite to be seen. The patient has difficulty in walking, sweats, and does not feed; he often lies down, and is unwilling to stand. If forced to get up he does so with difficulty. The general condition remains good, temperature, pulse and respiration normal. The fæces consist of small pellets, very hard, black, and have a peculiar and exceedingly disagreeable smell, which is almost diagnostic. The back is arched, and this becomes more marked as the disease advances.

There is generally paralysis, at first paraplegia, which becomes general and progressive, and death then shortly takes place.

Just before this condition is seen there is a rise in temperature, and a quickening of the pulse and respiration, with increased weakness, slight pulmonary congestion, heart disturbance and inflammation of the synovial membranes. The temperature rises to 39·5° or 40° C.; petechial spots appear on the conjunctiva and buccal mucous membrane. The respirations are quickened, and the pulse small, thready, and hard.

Usually the animal dies during an acute attack, but sometimes the active symptoms decrease, and great weakness sets in.

In such cases the patient may live for a long time, feeding to a certain extent, but incapable of performing any work. He is subject to painful muscular spasms; the back becomes more and more arched, loss of condition and deformity of the bones set in, and very often some of them are fractured.

The author lays particular stress on this second form of development, considering it a strong point in favour of the theory of infection, which has not yet been brought forward.

(2) *Period of Deformation.*—Generally these are local, and only implicate certain regions, although the whole body may be attacked.

(*a*) *General Deformity.*—The whole body may be curved, the spine arched, and the thorax and ribs flattened. The respirations are short, catchy, and painful. This condition has been seen in fifty-three out of eighty cases.

(*b*) *Local Deformity.*—This is generally seen in the flat bones, but the short ones may undergo great alteration. The alteration of the tendon and ligaments may be so great that the limb is trailed along the ground. The deformity is usually seen on the face and shoulders; the first was seen in ten, and the second in twelve out of eighty cases. All the bones are altered, the anterior nasal, zygoma, maxillary, particularly the lower ones, which become enlarged and thickened, giving the face a curious square look, especially in small horses.

The alteration in the scapula also gives the animal a curious appearance, the elbows being projected forward and outward, and becoming concave, which concavity increases as the bones enlarge and become less resistant. Movement is then nearly impossible, the pace is short, and the body is swayed from right to left in an attempt to balance. The author points out that at this stage of the disease a careful examination and analysis of the urine would be highly valuable, but being in remote places he never was able to carry it out. The various reports, both French and German, that have been made on this point he considers to be of but little value, as the urine was not examined on the spot. He has, however, always found it to be acid, and has never seen calcareous deposits in it.

(3) *Termination.*—These can be divided into four classes: fractures, organised articular lesions, cachexia, and death from infection.

(*a*) *Fracture* can be caused spontaneously, or by a slight effort at any period of the disease. Usually it is the long bones, but there is no rule. Sometimes even the ribs are broken.

(*b*) *Articular lesions* are frequent, they interfere with the motion of the joint, causing pain and rendering the animal useless.

(*c*) *Cachexia.*—This termination is common. The animal gradually gets weaker, and drags his hind limbs, loses condition, and is unable to support the weight of his body. He goes down and is unable to get up, and notwithstanding the thickness of the bedding the body is covered with sores. The deformed ribs press on the lungs, and the patient gets weaker and weaker, and dies from exhaustion.

(*d*) *Infection.*—The author states that this termination has not yet been mentioned by writers on the subject.

During the course of the disease the animal which has been showing the vague symptoms described suddenly falls into a state of extreme prostration, lies down, and refuses all food, the temperature rises to 40° or 41°, but the pulse is very irregular and the artery tense, the mucous membranes, dark and studded over with petechiæ. There is dyspnœa with an increase of temperature, and the animal dies in a few hours.

Diagnosis.—At the commencement, owing to the absence of any definite symptoms, diagnosis is most uncertain, but after the lapse of a short time the difference between lameness from osteomalacia and rheumatism is most marked, as in the latter there is local pain but no swelling, which is entirely absent in the former.

If the disease commences in the acute form, the history of the case and its development will show that it is not an acute sporadic disease.

Ballu looks on the enlargement of the bones of the face as diagnostic, but this is not invariably present.

Prognosis.—The prognosis is bad. Treatment is useless, and even if the animal does not die he is in such a condition as to be quite useless. The author states that he has only known one case recover and be fit for work.

Progress.—All the stages of disease that have been described may not be seen. In some cases there is only lameness, in others local deformity or paraplegia, and these symptoms may disappear temporarily, only to return again, and it is during these periods that fractures usually take place.

The duration of the disease is variable, and it lasts a long time if there are no complications.

Subjects.—The disease has been seen in the native horse and mule but not in ruminants, but it is mentioned that M. Camboulives, a veterinary surgeon in the French Army stationed at Dapcan, had a goat that was affected and which he kept alive for a long time. The table gives the age, breed, and number of cases in mules that came under the author's observation :—

Breed	Age						Total	Total effective
	6	7	8	9	10	11		
Algerian	11	12	11	8	2	1	45	59
French { Arles ...	3	5	8	4	1	—	21	73
French { Macon ...	2	1	2	4	1	—	10	40
French { Poitou ...	—	3	—	—	—	—	3	44
Chinese	—	—	—	—	—	1	1	1
Total	16	21	21	16	4	2	80	223

From these statistics the conclusion is arrived at that Algerian mules are peculiarly susceptible, and more so before they reach maturity; that adult animals are not so susceptible, and that Poitou mules enjoy immunity.

Lesions.—These are both local and general, but there are certain that are fairly constant.

(1) The chief changes are in the medullary substance which becomes fluid and early tinged with blood and contains blood clots.

(2) The hard tissue of the bone shows diminution in the calcareous constituents.

(3) The progress of the disease is from the centre of the bone.

(4) Disease of the periosteum is uncommon and when present is confined to the epiphyses of the long bones.

(5) The bone loses in weight sometimes as much as a fifth. The proportion of organic to mineral matter in healthy bone is,

according to Berzelius, $\frac{1}{2}$; in the lower jaw, in a case of osteomalacia, according to M. Pignet, it was $\frac{1}{16}$; Gorup-Besanes puts it at 16·62; and Pitha and Billroth, 10·22. If the ligaments are involved, which is not common, they are very soft, easily break, and are semi-elastic, somewhat resembling a stick of gum.

The majority of writers have only mentioned the bony lesions, the exception being M. Pécaud ("L'ostéomalacia des equides au Tonkin," *Revue Générale de Médecine Vétérinaire*, January 1, 1904, vol. iii., p. 1), who studied the disease at Dapcan, at the same time as the author was working at it at Sontay, and who also mentions the general organic lesions as being always present, no matter how long or short a time the animal lives.

The muscles and viscera have a dead leaf colour and a parboiled appearance, and are congested or studded over with hæmorrhagic patches of variable sizes; these are generally found on the endocardium and lungs, and more rarely on the intestinal mucous membrane. In one case they were in the heart substance, and on the buccal membrane, particularly round the lips.

It is on account of these lesions, the evolution of the symptoms, and the progress of the disease, that the author chiefly founds his theory of its infectious nature.

Nature of the Disease.—Various theories have been advanced, but the most generally admitted one, as regards Madagascar (Grandmowgin Martin, *Revue Générale de Médecine Vétérinaire*, 1905, vol. v., pp. 494, 499, 501), is the want of lime salts in the food.

The author, however, doubts the correctness of this theory, as an analysis shows that there is but little difference in mineral salts, particularly sulphates and phosphates, in native forage grown in Tonkin and that imported from France. Furthermore, it would, even if the difference was large, fail to account for the acute symptoms and cases of sudden death that take place.

If lime and magnesia, with sulphuric and phosphoric acid, are taken there is only a difference of 0·10 per cent. in favour of oats; 0·01 per cent. barley, over paddy, or undecorticated rice, which is the staple food of the country.

Analysis of French and Tonkin Forage.

Constituents	Oats	Barley	Paddy	Straw			
				Oat	Barley	Rice	Bamboo leaves.
Water	·14	14·50	13	—	—	17·36	47·08
Nitrogenous matter	10·60	11·50	7·44	0·38	·30	2·50	11·59
Fatty matter ...	5·50	2·80	2·32	4·80	1·70	·68	1·30
Cellulose	4·10	3·20	8·40	—	—	24·48	12·12
Starch and sugar	61·90	65·50	62·98	—	—	14·46	9·003
Mineral matter ...	3·90	2·50	5·86	5·734	5·214	12·68	6·58
Various	—	—	—	—	—	—	12·201

ANALYSIS OF ASHES.

Constituents	Oats	Barley	Paddy	Straw			
				Oat	Barley	Rice	Bamboo leaves
Silica	2·08	0·67	4·539	4·588	2·856	9·72	4·10
Sulphuric acid ...	0·04	0·09	0·03	0·079	0·118	0·0853	0·40
Phosphoric ,, ...	0·58	0·85	0·76	0·012	0·160	0·0923	0·204
Calcium ...	0·35	0·06	0·05	0·152	0·630	0·7758	0·4368
Magnesia		0·20	0·20	0·013		0·2469	0·1533
Potash ...	0·80	0·58	0·20	0·870	0·228	0·9775	0·78
Soda ...			0·12			0·5224	0·1875
Peroxide of iron		0·05	0·10			0·1039	0·0384
Chlorine ...	0·25	—	trace	0·011	0·252	0·1505	0·22
Loss ...		—	0·041			0·0054	0·627

As has been shown, Algerian mules are chiefly attacked. In their native land they are fed on barley, and there is only a difference of 0·01 in mineral salts between it and their new rations, so the influence of this cause must be nearly *nil*. The same remark applies to rice straw, the percentage of lime and magnesia being: 0·165 hay, 0·630 barley straw, and 1·0227 rice straw. This straw is eaten with great avidity, so much so that there is difficulty in keeping bedding down under the animals.

The native horse is almost entirely fed on bamboo leaves, which contain 11 per cent. of nitrogenous material, but only 65 per cent. of minerals, and consequently it would be expected that these animals would suffer, which is not the case.

The author thinks that the disease is infectious, and gives his reasons, which are based on the symptoms, the nature of the lesions, the special conditions under which he found it exist, and its reproduction in experimental animals.

He saw the first case in November, 1901. There was paraplegia, infiltrated mucous membranes, high fever, with petechiæ on the conjunctiva, the animal dying very shortly afterwards, and having only just arrived in the country, he mistook it for a case of septicemia. Several others of the same nature in animals that were lame, suffering from malformations, and sometimes fractures, having come under his charge his suspicions were excited, and he consulted M. Camboulives, who confirmed his diagnosis. During the past three years he has noticed the same symptoms of a variable interval in all his cases, viz., paraplegia, suddenly coming on, accompanied with high fever, in mules in which there was deformity of the face. This paraplegia became chronic with inflammation of the synovial sheaths, deformity of the scapula, rapidly increasing cachexia, the formation of ecchymosis after the slightest injury, and death from exhaustion, all of which he considers strongly resemble an infectious disease.

In all the *post-mortem* examinations he has made in which there has been cachexia, he has noticed the "dead leaf" colour and par-

boiled appearance of the tissues and organs that are soft and easily turn, that are common to all infectious diseases, and this, in common with the petechiæ and the readiness with which bruises are formed, all strengthen his argument.

Etiology.—This differs altogether in mules and horses, as has been mentioned, imported Algerian mules being the chief sufferers. These imported into Tonquin are between 4 and 5 years old and are in a debilitated condition from a trying voyage down the Red Sea and across the Indian Ocean. Being in this condition such young animals are in a favourable condition to contract the disease, or they are not acclimatised. It is remarked that adult animals which have been in the country any length of time are practically immune.

Horses.—The question of acclimatisation does not affect the native horse, but his surroundings and work of life are changed. The native uses his horse as a pack animal, as only a few of the head men ever ride. They are light, not weighing over 50 kilogrammes, and always go at an amble. With Europeans the pace is a trot or gallop, and the weight is much greater, and it is only among this class of animal that the disease is seen. In these, the first thing noticed is paraplegia, weakness of the loins, deformity and obscure lameness. The following case is given as an example:—

Country bred, aged 7 years, in good health and condition. Being wicked, he was castrated on April 5, and discharged cured in about a month. In less than a month after his discharge he became partly paralysed, and all the symptoms of osteo-malacia appeared. On July 26 he was unable to stand, and died on August 4. In this case the disease developed in four months, under the stimulus of the operation.

Treatment.—Only symptoms can be treated. In the earlier stages pilocarpine (0·25 gramme) with purgatives and intestinal antiseptics, such as benzo-naphtol can be given. In acute cases subcutaneous injections of strychnine (strychnine, 0·04 gramme, pilocarpine 0·08 gramme) have some effect on the paralysis. It seems, however, that the importation of adults in good condition, and better hygienic conditions, are the most practicable remedies; green food also seems to be a preventive.

(*Revue Générale de Médecine Vétérinaire.*)

Personal.

Professor Metchnikoff, the well-known scientist, who was invited to England by the Royal Institute of Public Health to deliver the Harben lectures, was entertained at dinner in the Trocadero Restaurant, on Monday, May 28, by a number of scientific friends and well-wishers. Professor Ray Lankester occupied the chair, and amongst those present were Sir John McFadyean, Dr. Lauder Brunton, Dr. Bulloch, Dr. Bashford, and many others whose names are known as leaders in the world of medicine and the allied sciences.

The many friends and students who know Mr. James Clark, F.R.C.V.S., of Coupar Angus, will be pleased to hear that he has sufficiently recovered from his long illness to be able to take his accustomed place as one of the examiners in class C. It is hoped that his convalescence will be uninterrupted.

Mr. Heley, M.R.C.V.S., late of Eastbourne, and who, during the late South African War, served as a captain in the Sussex Engineers, (Volunteers), and has since been promoted to the rank of major, has recently been appointed as Veterinary Surgeon to the Para Electric Tramways and Lighting Company in Brazil.

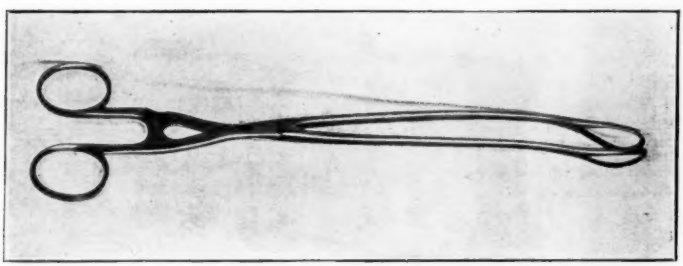
New Instruments and Appliances.

MESSRS. HUISH AND CO. have made for me a pair of bitch forceps which have the following advantages over those I have yet seen :—

(1) The blades are quite apart from the end of the fenestration to the joint, and therefore cannot nip or bruise the vaginal mucous membrane—the joint is bevelled for the same reason.

(2) The Collins' joint gives greater firmness to the grip.

(3) Their size renders them equally useful in small and medium-sized bitches.



(4) They are perfectly aseptic in principle.

(5) As the ends of the blades are in close opposition, not only the head of the fœtus but any part presented can be firmly grasped.

The "Record" Hypodermic Syringe, supplied by the same firm, is far away ahead of any hypodermic out. It is readily taken to pieces, boiled, and thus rendered clean in every way. The piston fits the barrel so perfectly there is never any leakage beyond the plug—a great fault in most hypodermic syringes.

Yours faithfully,

F. WAINWRIGHT ANDERTON, F.R.C.V.S.

Halifax.

Books and Periodicals, &c., Received.

La Clinica Vétérinaria; Rhodesian Agricultural Journal; Berliner Tierarztliche Wochenschrift, Revista de Medicina Veterinaria; Fortschritte der Veterinar-Hygiene; Deutsche Tierarztliche Wochenschrift; Department of Agriculture (Ireland); Cape Agricultural Journal; Board of Agriculture (England); Tropical Agriculturist (Ceylon); Farm and Home; Modern Medicine; Report of the Transvaal Agricultural Department; American Veterinary Review; Bureau of Animal Industry; Journal of the Royal Army Medical Corps; The Veterinary News; Veterinary Physiological Notes (P. A. Fish); Inland Revenue Department Report (Canada); Farm and Home, The Creamery Journal; Recueil de Médecine Vétérinaire; Bulletin Vétérinaire.

Letters and Communications, &c.

Syntax; A Teacher; Mr. F. Eve; Mr. Woodward; The *Lancet*; Mr. Steele; Mr. W. Robertson; Colonel Nunn; Lieut. Holness; Mr. Sturgess; Mr. Pauer; Major Marriott.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements), should be addressed to the Editor.

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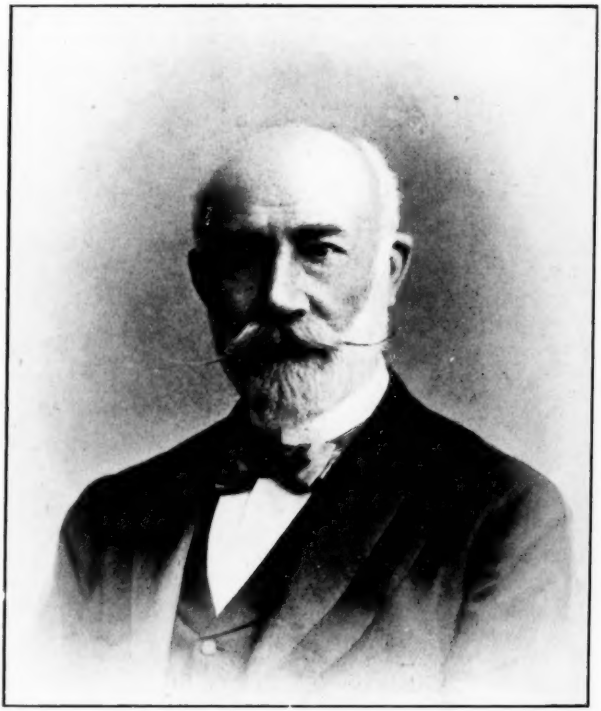

THE LATE MR. A. C. COPE, M.R.C.V.S.

A Past President of the Royal College of Veterinary Surgeons, and late Chief Veterinary Officer to the Board of Agriculture.